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STEEL CONSTRUCTION

Pittsburgh

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INDEX TO CONTENTS, PAGE 352.

ADVERTISERS' INDEX, PAGE 24.

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BY-PRODUCT COKE AND GAS OVENS

The most efficient method of carbonizing coal is in KOPPERS OVENS and the best coke and by-products are produced by this process.

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Builders of

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SIZES AND EQUIVALENT LENGTH OF SERVICES.

Solutions Obtained from Diagram for Enlargement of Service Pipe Extensions to Compensate for Lengths of Smaller Sizes Under Ground.

By J. M. SPITZGLASS.*

The distance between the gas main and the wall of a building to be piped for gas is generally a short length, so that the size of pipe determined for the building service can be continued to the main without appreciable drop of pressure from the main to the starting point of the building service. The rules and regulations for housepiping issued by gas companies usually include tables showing size of service and maximum length allowable for a given capacity in the building; but these rules have no provisions to limit the length of service from main to building line for a given size, because the services are considered to be short enough to come well below the requirement outlined for building services.

While this assumption may be generally true for the actual length of services, that is for the distance between the main and the building wall, it is not applicable to all when a part of the service in place happens to be of a different size; and it is desired to determine whether that part has to be replaced by another size or not. To make this more specific, suppose the building service, according to the rules, is to be a 3″ pipe, and that there is in the ground a 2″ stub from the main to the lot line of the building; then the question involves the length of a 3″ pipe equivalent to the length of the 2″ pipe in place, and it has to be determined whether this equivalent length is, or is not, within the requirements set by the rules; that is whether the 2″ stub can be left in place or not. In most cases this part of the service is covered by paving, and its removal and change to a larger size become very expensive.

To have a clear conception of the term "equivalent length," when applied for the transfer from one size to another, it is necessary to bear in mind that when the size of pipe is decreased, the velocity of the gas in the pipe to give the same volume of discharge, is increased as the square of the diameter ratio; the friction drop for a unit of length is increased at least at the 5/2 power of the velocity, which makes the total drop for a unit length to increase at least as the 5th. power of the diameter ratio. Consequently the number of unit lengths of the larger size that will take the same drop as the unit length of the smaller size will also increase in this proportion; that is, the equivalent length of the larger size in terms of the smaller size will be at least as the 5th power of the diameter ratio. If the diameter ratio is only 1 to 2, the equivalent length will be at least 1 to 2 multiplied by itself 5 times, which is 1 to 32. If the diameter ratio is 1 to 4, the equivalent length will not be less than 1 to 4, multiplied by itself 5 times, which is 1 to 1024. The exact equivalent length for service pipes as worked out theoretically is given in the following table:

Nom. Size.	¼ in.	1-in.	1¼-in.	1½-in.	2-inch.	2½-in.	3 in.	4-in.
¾″	1	4	19.4	46.7	191	513	1704	7470
1″		1	4.8	11.6	47.5	127.5	4257	1857
1¼″			1	2.4	9.9	26.5	88	385
1½″				1	4.1	11	36.5	159
2″					1	2.7	8.9	39
2½″						1	3.3	14.5
3″							1	4.4
4″								1

*Inventor of the "Spitzglass Slide Rule and Flow Computer."

For instance, 1 foot of ¾″ pipe is equivalent to 4 feet of 1″ pipe; 19.4 feet of 1¼″ pipe; 46.7 feet of 1½″ pipe, and so on. It may be of interest to note that the equivalent length of pipe is not affected by the order in which the sizes are arranged. For instance, in the case of two sizes, say 1″ and 2″ pipe, covering 100 feet each, the same amount of gas will be delivered with the same drop of pressure whether the 2″ comes from the gas main and is then reduced to 1″; or whether the 1″ comes from the main and is increased to 2″.

When the equivalent lengths of pipes are considered, it is important to make allowance for the pressure drop caused at the inlet from the main to the service (which is sometimes a size smaller than the service), and also for the drop in pressure caused by right angle bends in the service.

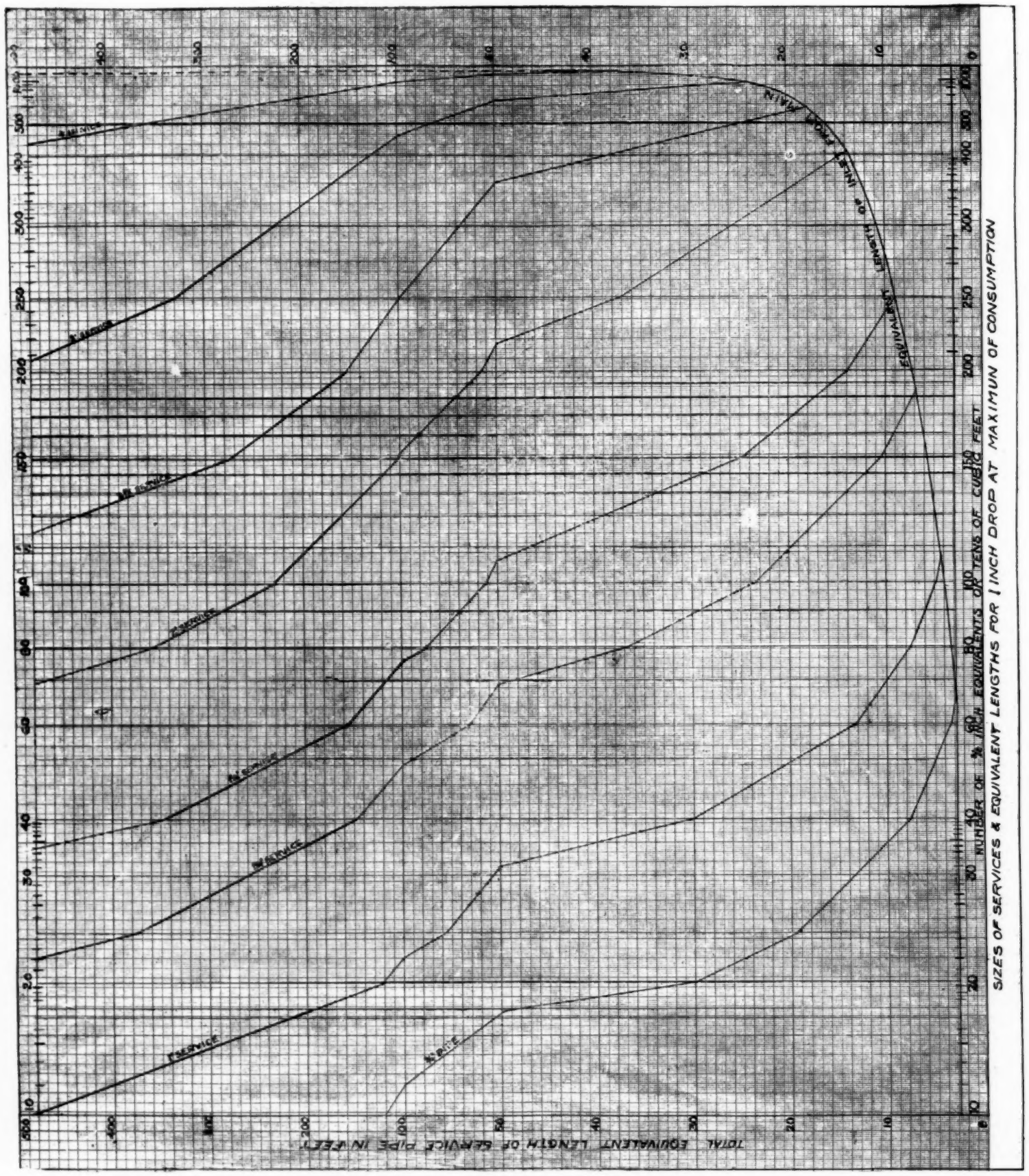
The experiments conducted in the laboratory of the Peoples Gas Light & Coke Company, of Chicago, in 1912 (see "Flow of Gas Formulae," by J. M. Spitzglass, Proceedlngs, Illinois Gas Association for 1912), showed that the drop in pressure through inlets and elbows can be represented by a friction drop through a definite length of the same size pipe. In a ¾″ opening the drop through the inlet was equal to a friction drop of 2.8 feet of ¾″ pipe; and the drop through an elbow was equal to 1.1 feet of the same size. In a 4″ pipe the drop through the inlet is equal to the friction drop of 37 feet of 4″ pipe, and the drop through an elbow equal to the drop of 14 feet of the same size pipe.

The equivalent length of inlets and elbows for other sizes is given in the following table:

Nom. Size.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.	2½-in.	3-in.	4-in
Equivalent length of inlet	2.8	4.3	6.8	9.	13.8	18.	25.	37.
Equivalent length of right angle bend	1.1	1.7	2.6	3.3	5.1	6.7	9.3	14.

Based on these figures the accompanying diagram was prepared to show graphically the equivalent lengths of the various sizes, and also the effect of the inlet drop on the capacity of the pipe. The equivalent length of pipes is a function of the size only, and is independent of the discharge or drop of pressure in the line as they are the same on both sizes. It was considered more advantageous, however, to design the diagram for a constant drop of 1″ of water from the main to the building service, showing the corresponding volume and equivalent length for each size. However, the use of the diagram is not limited to this drop, as will be explained in the directions to follow.

The diagram has a vertical scale, reading in feet of equivalent length or of actual length, as the case may be, from zero to 500 feet. This horizontal scale reads in ⅜″ equivalents of discharge, or tens of cubic feet. A set of broken lines is laid out to represent the normal sizes from ¾″ to 4″ inclusive; and one curved line cutting off some of the lower part of the diameter lines, shows the equivalent length of inlet drop for each size of pipe, and also the


SIZES OF SERVICES & EQUIVALENT LENGTHS FOR 1 INCH DROP AT MAXIMUN OF CONSUMPTION
NUMBER OF ½ INCH EQUIVALENTS OR TENS OF CUBIC FEET
TOTAL EQUIVALENT LENGTH OF SERVICE PIPE IN FEET
EQUIVALENT LENGTH OF PLAIN
¾ SERVICE
1 SERVICE
1½ SERVICE
2 SERVICE
3 SERVICE
4 SERVICE

volume that can be discharged through this inlet for the drop on which the diagram is based, or 1″ of water.

The vertical scale reading in feet is on the left and also on the right side of the diagram; the horizontal scale reading in ⅜″ equivalents is on the bottom and also at the top. Part of the diameter lines are shaded heavier to indicate the size to be used for the given volume according to the general rules of gas companies. The diagram includes sizes lower than 1½″, not that they are recommended for new installations, but for leaving in place old stubs that are below the frost line, wherever they are shown to be sufficient for the required maximum delivery.

The use of the diagram will be explained by the following specific examples:

1. Find length of 2″ service equivalent to 25 feet of 1½″ service.

Solution.—From intersection of 1½″ service with 25 feet on length scale, follow vertically to 2″ service line, and read horizontally from intersection the required answer, 100 feet.

2. Find length of 3″ service equivalent to 1½″ inlet from main.

Solution.—From intersection of inlet line with 1½″ service, follow vertically to 3″ service line, and read horizontally from this intersection the required answer, which is 330 feet.

3. Find length of 2″ service equivalent to 15 feet of 1½″ pipe having 1¼″ inlet from the main.

Solution.—From intersection of 1¼″ service with inlet line, follow vertically to 1½″ line. You will find that this point corresponds to 16½ feet on the length scale. Follow from this point obliquely along the 1½″ line until you cover an additional length of 15 feet, that is until you read 31½ feet, intersecting the 1½″ line. From this intersection, follow vertically to the 2″ line, and read on the length scale the answer, which is 130 feet.

4. Required maximum length of pipe that can be used for various sizes in supplying 200–⅜″ equivalents (2,000 cubic feet per hour) with 1″ drop through the line.

Solution.—From the 200 equivalents on the horizontal scale, follow verticaliy and note that the 1½″ line shows a length of 14 feet less 9 feet at the inlet line, or a net of 5 feet. Next, the 2″ line shows a length of 57 feet, less 14 feet, at the inlet, or a net of 43 feet. The 2½″ line shows 155 feet, less 18 feet, at the inlet, or a net of 137 feet. The 3″ line shows over 500 feet of pipe.

5. For a delivery of 60–⅜″ equivalents (600 cubic feet per hour) the building service in 1½″ pipe. Is is right to continue the service 50 feet from the building from a 1¼″ stub of 20 feet with 1″ opening at the main, assuming the drop allowed from main to the building is 1″ of water?

Solution.—From the 1″ inlet point, follow vertically to the 1¼″ service, note that the intersection corresponds to 20.5 feet on the 1¼″ line. Turn obliquely along the 1¼″ line until you cover an additional length of 20 feet, that is until you reach 40.5 feet intersection of the 1¼″ line. From this point cross vertically to the 1½″ line, and note the reading of 96 feet on that line. Turn obliquely on 1½″ until you strike the 60—⅜″ equivalents, and read 155 feet as the corresponding total length allowable for the size. Subtract 96 feet equivalent length made up by the stub and opening, and you have 59 feet left. The answer is leave stub in place and continue 1½″ service.

6. Same condition as in 5, but the demand is for 70 equivalents.

Solution.—From problem 5 repeating the operation we see that 96 equivalent feet are covered by the inlet and stub. On the 70 ⅜″ equivalents the total length of the 1½″ line is only 115 feet, that is this size cannot be used for a length over 115–96, or 19 feet. Then omit the 1½″ line and go from the 1¼″ intersection straight to the 2″ line. Note that the 2″ line is intersected by this at 390 feet of length but the margin length on the 2″ line at 70 ⅜″ equivalents is 465 feet. Subtract this 390, and you have 75 feet left to the margin. The answer is—leave stub in place and continue 2″ service, from stub to building service.

7. Same condition as in 5 and 6, but the demand is 80 or more equivalents.

Solution.—Note that the end of the stub equivalent on the 1¼″ line, as shown in 5 and 6, is on the wrong side of 80 equivalents, and, therefore, it has to be removed.

8. What is the maximum length allowable for 120—⅜″ equivalents on a 2″ pipe basis, if the drop through the service can be as high as 2″ of water?

Solution.—On the 120 equivalents the margin of the 2″ pipe reads 160 feet. Since the drop is twice as large as the one assumed for the diagram, multiply this length by two. The answer is 160x2 = 320 feet.

9. What is the approximate amount of gas that can be blown to the atmosphere in an hour from a 1¼″ opening in a main under 6″ of water pressure, if the opening is fixed up only with an inlet fitting as applied to services?

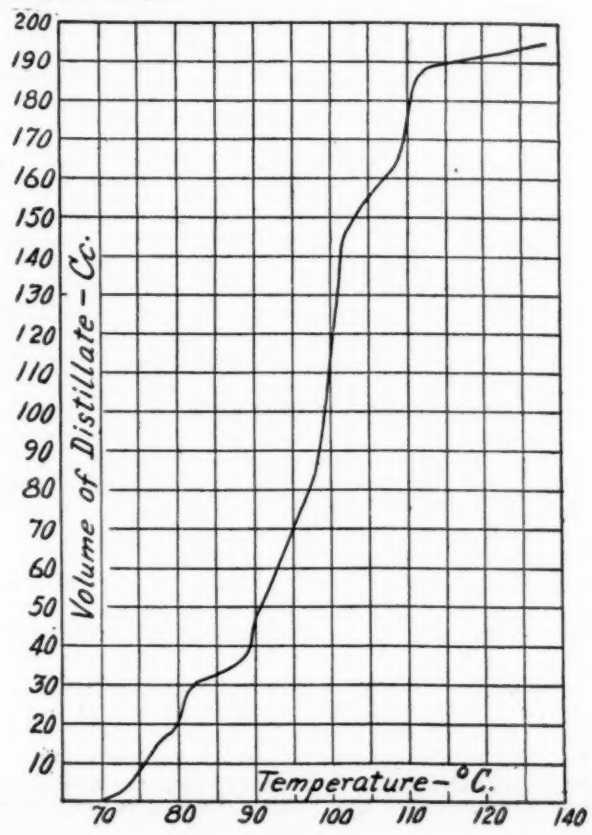
Solution.—From the inlet point of the 1¼″ line follow vertically until the intersection of the furthest size which is 1½″. Note at this point the length margin is 180 feet. Divide this amount by the pressure, 180 ÷ 6=30 feet. Follow down on the 2½″ line to the 30 feet margin and read on the intersection 450—⅜″ equivalents, or 4,500 cubic feet per hour.

The last problem is given more for curiosity than for use, merely to show how lines set to proper scale are binding on the quantities which they represent.

Examination of a Condensate from Carburretted Water Gas.

E. T. STERNE, in "Journal of Ind. and Eng. Chemistry."

A sample of a condensate formed during a very cold winter several years ago in the service pipes of the local gas works has been examined by us. The liquid was of a pale amber color, with rather a sharp odor, and a specific gravity of 0.740. The plant manufactures carburetted water gas, using anthracite coal and Pennsylvania crude petroleum.



The liquid proved to be composed of low boiling point compounds, 95% distilling below 120° C. and 99% below 130° C. The sample was fractioned carefully in order to locate individual compounds in substantial amounts, that would make their presence known by irregularities in a curve plotted from the results.

The fractionation was made using a 12-pear still head, and collecting the distillate in 2° fractions. The accompanying curve shows the boiling point to rise very regularly with the exception of breaks at 80 to 82°, 98 to 100° and 110 to 112°. In order to obtain an idea of the relative amount of unsaturated hydrocarbons in the different fractions the bromine absorption was determined in the combined distillate for each 10°. Excess of a *N*/10 solution of bromine in carbon bisulfide was allowed to react in the dark on 1cc. of each of the noted fractions for 15 minutes. The excess of bromine was titrated with *N*/10 sodium thiosulfate.

Fractions.	G. Br absorbed by 1 cc.	Fractions.	G. Br. absorbed by 1 cc.
70- 80°	0.00950	110-120	0.00820
80- 90°	0.00930	126-130	0.01580
90-100°	0.00875		
100-108°	0.00827	Original	0.0114

If we assume that the unsaturated is due to dodecylene boiling at 96° the percentage of unsaturation is

$$11.4 = 168/160 \times 1/740 = 1.62\%.$$

The fraction boiling at 108–112° was redistilled and 1 cc. of that which come over at 111° was nitrated and toluene identified. The whole fraction, 108–112, compared very well with commercial toluene.

The paraffins and olefins were estimated by use of dimethyl sulphate, which gave 77.5% paraffins and olefins undissolved.

The composition of the sample thus works out as follows:

Paraffins.	Olefins.	Aromatic.	Total per cent.
75.88	1.62	22.5	99.90

The percentage distilling at 78 to 80° was about 12%, corresponding to benzene mainly; that at 108 to 112, corresponding to commercial toluene, being about 10%.

The above results led the author to conclude that the possibility of producing toluene on a commercial scale during the manufacture of carburetted water gas may be not unreasonable. It would probably involve some method of condensing or absorbing the toluene along with the benzene and other compounds, and the subsequent separation of these compounds, retaining the toluene and returning the other for illuminating and heating purposes.

ROUTINE OF BILLING AND RECEIVING DEPARTMENT.

By W. P. BAIRD, to the Canadian Gas Association.

It has frequently occurred to me that, so far as conventions are concerned, a very important phase of our business is side-tracked, the routine departments being allowed to run along in a more or less hap-hazard, old-fashioned rut—most of us in charge of such departments being of the opinion that our systems cannot be improved upon. But you will, no doubt, agree with my conclusions that efficient billing and collection of income is a most important part of our business. Being connected with a combined gas and electric company, I naturally treat with routine from the viewpoint of this dual condition.

There has been considerable discussion as to the advisability of combining gas and electric companies; also as to the desirability of combining the two elements where companies have been amalgamated or are controlled by the same interests.

It will not, however, be my purpose to discuss the advantages or disadvantages of such amalgamations—this being a matter which is more or less controlled by "high finance"—but I am strongly of the opinion that where gas and electric companies are amalgamated it is most advantageous, not only for economy's sake but also from the standpoint of convenience to the customer, that the two services be closely linked together in the administration of the company's business.

For a number of years our company has combined the gas and electric elements, as far as consumers' accounts are concerned. Under our system we show charges, as much as possible, on one monthly account, combining charges for 160,000 gas and electric meters, and thereby reducing our monthly ledger accounts to 75,000, and incidentally effecting considerable economy in clerical labor. The method has proven a success, from the standpoint of the consumer and the company alike.

Conditions in Montreal are probably more complicated than in most cities, as, in addition to the extraordinary large proportion of foreign and floating population, we also have to contend with the dual language proposition, both as regards printed matter for the public and in the employment of our staff.

It has been found that the reduction in number of departments lessens the "red tape," and leaves less chance for friction caused by transferring matters from one department to another, and consequent shifting of responsibility. The combination of the two elements in the billing and receiving departments has given such universal satisfaction that the management has adopted the principle, "The fewer the departments the more efficient the work," and it has been decided to combine gas and electric departments wherever possible; when necessary, dividing the city into sections or districts, rather than dividing the business itself into different departments.

While this paper treats with consumers' accounting, *i. e.*, meter reading, billing and collection methods as practiced by our company, I have touched on other departments sufficiently to show the routine practised from the "securing of an order" to the "collection of the account."

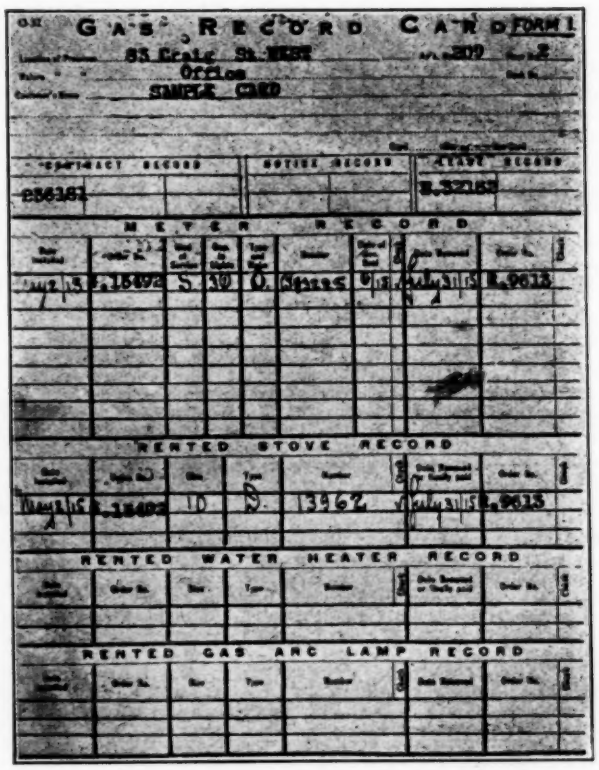
New Business or Sales' Department.—This is a most important department of our business, and your Association has given very considerable study and attention to this branch, and you will, no doubt, all agree that a written contract or order from the consumer is absolutely necessary at the commencement of business relations. This is most essential from the standpoint of the accounts' department, not only to fix the basis of charge for the service or goods supplied, but to enable the collection department to collect outstanding indebtedness, particularly where consumers are delinquent in their payments.

I would like to impress upon representatives of the new business section, not only the necessity of having contracts and orders plainly and correctly filled in, but also the importance of correctly and conscientiously reporting information secured regarding the credit of the consumer; as the consumers' standing in the accounts' department is based to a great extent, on the inquiry and investigation made at the time the contract or order is written.

In our company contracts and orders written each day are turned over to the credit man of the accounts' department the same night, who approves the contract for credit (based on the salesman's report or past record of consumer); and we make a practice of demanding a deposit or guarantee in case of doubtful credit, more particularly as regards commercial consumers starting new businesses.

When contracts have been approved for credit, they are listed and classified the same night by the new business department, for the purpose of keeping a record and details of business written, and are then numbered and forwarded to what we term our service, Complaint and Record department.

Service, Complaint and Record.—This department embraces the keeping of a most complete card catalogue of consumers, streets arranged alphabetically, and numerically by street numbers. The forms are self explanatory, and you will note that the record is complete, and applies more particularly to the premises than to the consumer. Similar cards are used for electric lighting and power service. This department also keeps maps, charts, catalogues, etc., pertaining to electric lines, transformers, gas mains, services, etc.


GAS RECORD CARD FORM 1

83 Craig St. West — 209

Office

SIMPLE CARD

CONTRACT RECORD — NOTICE RECORD — CLOSE RECORD

256181 — 3.32182

METER RECORD

May 15	15402	S	39	O	Sprague			May 31 15	9613

RENTED STOVE RECORD

May 15	15402	10	S	13962			May 31 15	9613

RENTED WATER HEATER RECORD

RENTED GAS ARC LAMP RECORD

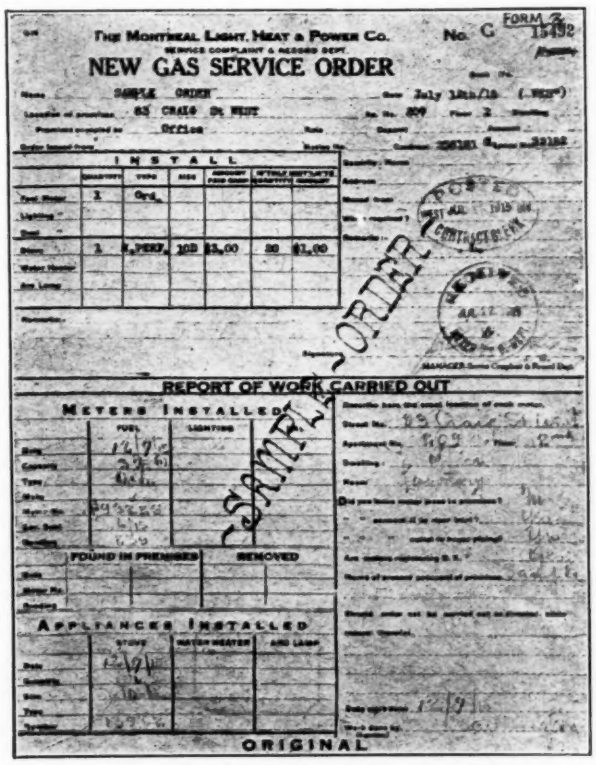
Form No. 1.—Gas Record Card.

This department issues all orders pertaining to the consumer's installation, sales, etc., and also receives, and distributes to the proper departments, all telephone and written complaints in connection with the service, fulfilling the function of a record order and clearing department for the different branches of the organization.

When contracts or orders are received, the record card is started; orders issued, contract, order number, etc., is then recorded on the card, and it is placed in its proper location in the catalogue for ready reference in event of inquiry from the consumer or employees requirirg information relating to orders in hand for execution.

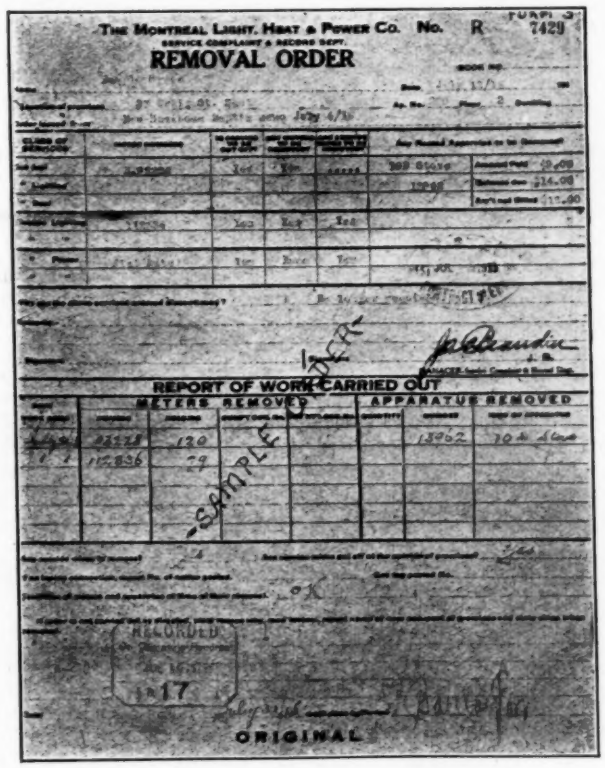
New installation orders are issued in quadruplicate and distributed to the several sub-departments with details of work required to be done by each department. In the case of gas service, the original and duplicate orders are forwarded to the meter department; the original is then handed to the fitter who installs the meter or appliances and makes his report on the order accordingly. The duplicate is retained in the fitting department office, as a check or follow-up copy, until the original is turned in completed by the fitter, and as this company, during "May moving season," makes a practice of delivering meters without installing same (except in cases where we install a gas stove or other appliance of like nature), the duplicate order is used for inspection purposes later on. The triplicate is retained on file in the Service Complaint and record department as a check copy and for general information, also to insure that the original order is returned completed

in due course. The quadruplicate copy is sent to Audit department for audit purposes.



Form No. 2.—New Gas Service Order.

This form combines gas and electric services, the work being performed by the same man, or in conjunction with each other; this is a recent innovation and is proving satisfactory and economical. The routine of electric orders is very similar to the gas, except that there is considerable more detail involved, owing to the inspection of wiring, etc., prior to the installation of the meters.



Form No. 3.—Removal Order.

When original orders have been executed by the departments concerned, they are returned to the Service, Complaint and Record department, the installation of the meter and other particulars are recorded on the record card, other records completed, such as statistical information of meters, lamps, etc., installed, and the original order is then forwarded to the Billing and Receiving or Hccounting department for consumers' accounting purposes.

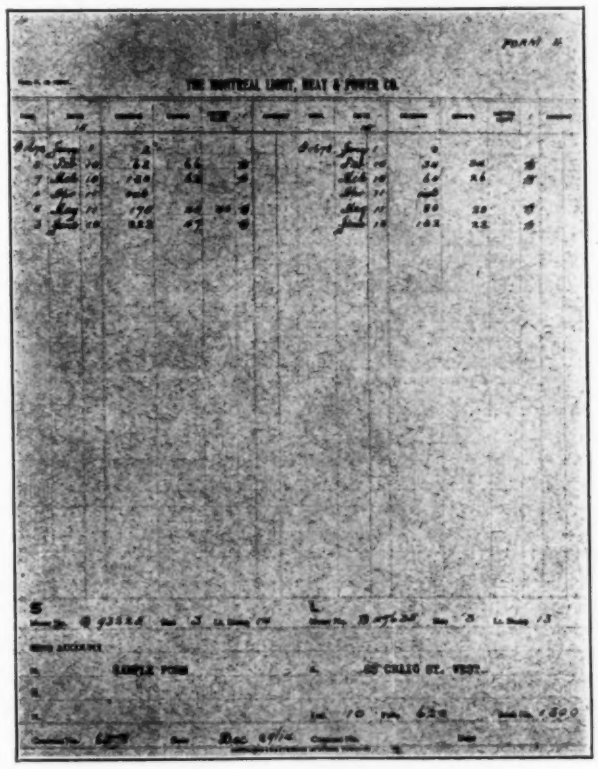
Consumers' Accounts Department.—Billing and Receiving Department.—This department embraces all matters pertaining to consumers' accounts, i. e.. from the reading of the meters to the collection of the accounts; and also attends to all complaints in regard to high bills, etc., and we have a specially trained staff working under the direction of this department, competent to inspect or test both gas and electric meters, and otherwise investigate and adjust consumers' complaints. We have found it advantageous instead of dividing the department into sub-departments, i. e., meter reading, billing aad ledger keeping and collecting departments (as done in most companies), to combine them, and divide same into two divisions, corresponding to the natural division of the city of Montreal.

These divisions are designated East and West, and in the arrangement of our offices we have endeavored to have our layout meet the requirements of this division.

When an installation order is received from Service Complaint and Record department, the first operation is to make up a combined billing and meter sheet, ledger sheet and addressograph plate. The meter sheet is then turned over to the chief meter reader, who stamps the installation order as having been received, and it is then placed in its proper location in the meter binder, the ledger sheet being turned over to the ledger keeper. The completed original installation order is then forwarded to the Audit department.

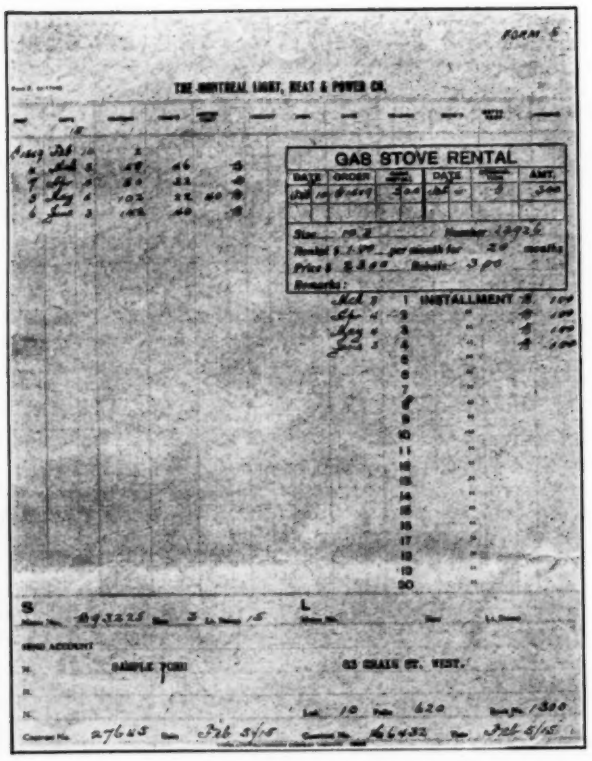
Meter Reading and Billing Forms.—These forms were adopted some years ago to meet these conditions, i. e., separate meters and different rates for fuel and lighting gas service, also prepayment or ordinary meters; and electric service to take care of different makes and types of meters, such as meter reading direct in kilowatt hours, 100 watts, or having billing constants, multipliers, etc., also complicated rate conditions.

For the past two or three years we have had a uniform rate for gas, and have been gradually displacing the two meter systems, thereby simplifying matters from a billing standpoint; and have also been endeavoring to simplify and standardize our electric rates. We have, however, a considerable number of consumers where the old condition still exists, but we hope in the near future to modify our regular forms to at least combine the gas and electric meters on the same meter sheet, when ordinary conditions apply, i. e., one gas and one electric meter in the same consumer's premises. Our meter reading sheets are a combined meter reading and billing form.



Form No. 4.—Gas Meter Sheet.

This form is pink for ordinary meters, and blue for prepayment meters.


FORM 5

THE MONTREAL LIGHT, HEAT & POWER CO.

GAS STOVE RENTAL

DATE	ORDER		DATE		AMT.

Size ... Number ...
Rental $ ... per month for ... months
Price $ ... Rebate ...
Remarks:

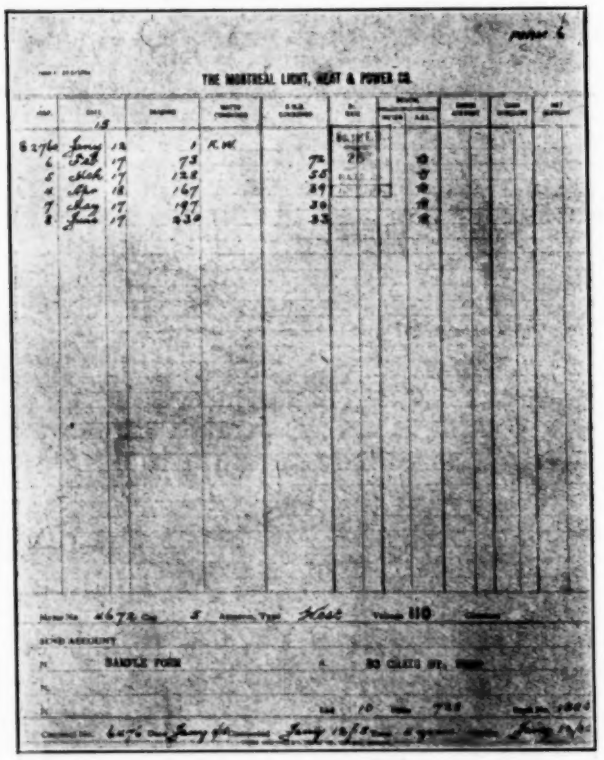
INSTALLMENT

S L

SAMPLE JOHN 63 CRAIG ST. WEST.

Form No. 5.

This is used where consumer purchases a gas stove or other appliance on the monthly rental plan.


FORM 6

THE MONTREAL LIGHT, HEAT & POWER CO.

SAMPLE JOHN

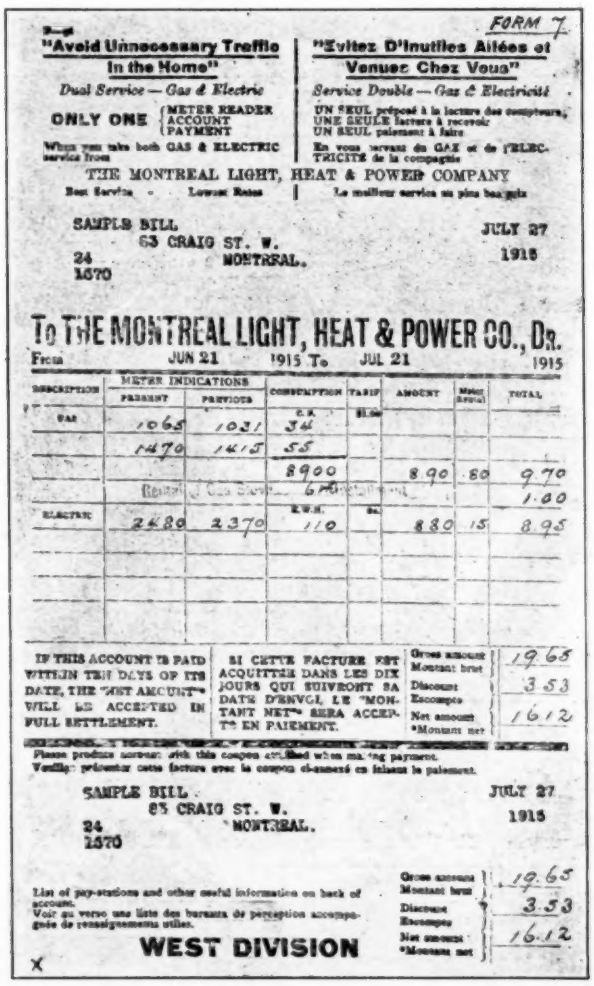
Form No. 6.—Electric Lighting Meter Sheet.

This covers ordinary rate conditions; have other similar forms for special rate conditions.

Meter Readiny Department.—This department is divided into East and West Division, each in charge of a Chief Meter Reader, whose duty it is to allot the meter books to be read each day, check reports of meters read, and not read, and other clerical work in connection with the department. Each division is, of course, divided into ledger districts, and each ledger district sub-divided into meter reading districts. Meter binders are loose leaf, each binder representing an average meter reading day for one man, and the meter sheets are arranged in meter books numerically by street number.

The duties of meter readers are to read meters, both gas and electric, collect from slot meters, making a daily report of total meters read and not read, also collections; reporting any irregularities, such as meters standing, abnormal consumption conditions, etc. Meter readers are paid on a piece work basis, and even with our complicated conditions we find this system works out most satisfactory. We read meters daily, the same as is done in all large companies, having a regular system for following up "pick-ups" for outs, etc.

Billing Routine.—We render bills monthly, except a few weekly accounts, such as theatres, moving picture shows, etc. Meter Reading Department furnishes a list of books read each day to the addressograph department, and name, address, date, etc., is printed on the body of the bill, and also on the coupon, by the addressograph.


FORM 7

"Avoid Unnecessary Traffic In the Home"

Dual Service — Gas & Electric

ONLY ONE { METER READER / ACCOUNT / PAYMENT

When you take both GAS & ELECTRIC service from

"Evitez D'Inutiles Allées et Venues Chez Vous"

Service Double — Gas & Electricité

UN SEUL préposé à la lecture des compteurs,
UNE SEULE lecture à recevoir
UN SEUL paiement à faire

En vous servant du GAZ et de l'ELECTRICITÉ de la compagnie

THE MONTREAL LIGHT, HEAT & POWER COMPANY

Best Service - Lowest Rates | Le meilleur service au plus bas prix

SAMPLE BILL
63 CRAIG ST. W.
24 MONTREAL.
1570

JULY 27
1915

To THE MONTREAL LIGHT, HEAT & POWER CO., Dr.

From JUN 21 1915 To JUL 21 1915

DESCRIPTION	METER INDICATIONS PRESENT	PREVIOUS	CONSUMPTION	TARIF	AMOUNT	MISC. EXTRAS	TOTAL
GAS	1065	1031	C.F. 34				
	1470	1415	55				
			8900		8 90	80	9 70
	Rental Gas Stove		6 mos.				1 00
ELECTRIC	2480	2370	K.W.H. 110		8 80	15	8 95

IF THIS ACCOUNT IS PAID WITHIN TEN DAYS OF ITS DATE, THE "NET AMOUNT" WILL BE ACCEPTED IN FULL SETTLEMENT.

SI CETTE FACTURE EST ACQUITTÉE DANS LES DIX JOURS QUI SUIVRONT SA DATE D'ENVOI, LE "MONTANT NET" SERA ACCEPTÉ EN PAIEMENT.

Gross amount / Montant brut	19 65
Discount / Escompte	3 53
Net amount / *Montant net	16 12

Please produce account with this coupon attached when making payment.
Veuillez présenter cette facture avec le coupon ci-annexé en faisant le paiement.

SAMPLE BILL
63 CRAIG ST. W.
24 MONTREAL.
1570

JULY 27
1915

List of pay-stations and other useful information on back of account.
Voir au verso une liste des bureaux de perception accompagnée de renseignements utiles.

Gross amount / Montant brut	19.65
Discount / Escompte	3.53
Net amount / *Montant net	16.12

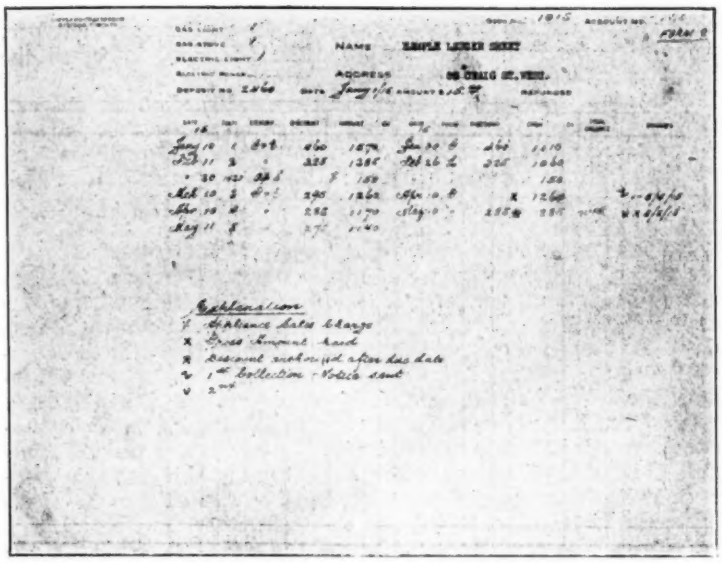
WEST DIVISION

Form No. 7.—Bill Head.

Our meter reading form is a combined meter reading and billing record, that is to say we do not transcribe the meter readings to a ledger or register, as is done by most companies. The bills are made directly from the original meter reading sheets, combining gas and electric charges on the same bill, and also including any charges for gas stoves or apparatus sold on installment or rental plan. The billing operations are briefly as follows:

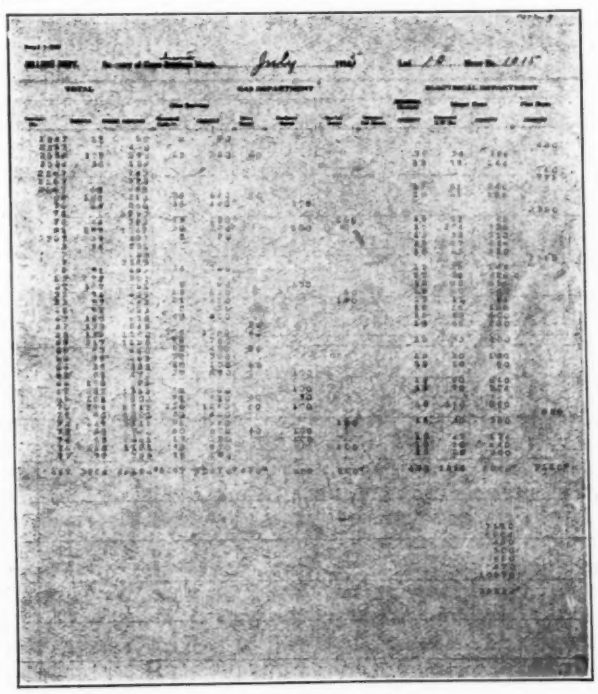
(a) Meter readers, when they report each night, turn in prepayment collections direct to the treasurer's department, and the following day the prepayment audit clerk audits the meter readers' reports of consumption and collections, ascertaining that the consumption has been correctly extended in meter book, and that the amount of money turned in is the correct amount for the gas consumed as indicated by the meter readings; and we make a practice of changing our meter readers' routes each month, thereby preventing their recording fictitious readings.

(b) Meter books are turned over to billing clerks, who transcribe meter readings onto the bill, checking the consumption with meter reader's extension, and completing the extension on the bill head. At present, we do not make any extension on our billing sheets, other than for special rates or conditions where the charges are complicated.



Form 8.—Ledger Sheet.

(c) Ledger sheets are kept in loose leaf binders, in ledger districts by streets and consecutive by street number. Bills are turned over to ledger keepers, who enter same in ledger, recording the meter reading date, description of service, i. e., (G&E) gas and electric, (G) gas, or (E) electric, also the discount and gross amount of the account; note that we simply post in the ledger the total amount, no record being kept in the ledgers as to the details of the charges other than as previously stated.

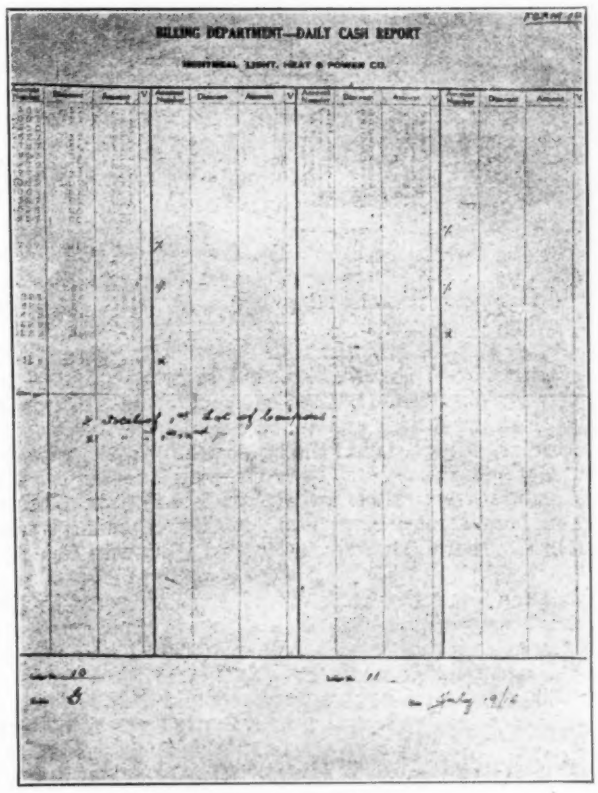


Form 9.—Summary of Sales Sheet.

(d) When bills have been entered, ledger keepers hand them over to the adding machine operators, who summarize them, and from these summary sheets we compile our monthly income, distributed according to our general ledger accounting. This is done on Burrough's adding machines, most of them split to add three columns at a time, but a shuttle carriage machine of the latest improved type will add six columns at one operation, thereby greatly facilitating the tabulation and compiling of our summary or sales sheets. Note that the sub amount columns of our sales or summary sheet must agree with the total representing gross amount of consumers accounts, and we thus obtain an automatic check that bills have been correctly extended. We find the adding machines greatly facilitate our operations.

(e) In our power business, a great deal of which is flat rate or combined fixed monthly charge and meter rate, we have found it advisable to specialize to the extent of keeping separate billing binders, making separate bills, etc., the forms being on the same lines but more intricate than the gas and the electric service. In the case of power and large commercial consumers, we read meters about the end of each month, so that the accounts represent practically a calendar month's service. We also segregate these ledger accounts into what we term special ledgers, but use the same form of ledger sheet as for the regular gas and electric consumers, power, gas and electric service, sundry sales, etc., being entered on the same ledger sheet. This, of course, means a diversion from our regular routine, and represents approximately 15% of our consumers, but it has the advantage of enabling us to give closer supervision to billing and collection of large accounts. In the regular ledger binder we carry a blank ledger sheet as an index to the special ledger.

Cash Receipts—Posting, Etc.—Bills are due and payable within ten days of date of account, and if not paid accordingly the gross amount is due and payable. Bills can be paid in cash, or by cheque, express or by post office order, at the company's head office, branch offices, or at local branch banks as per list on the back of the account. When payment is made, coupon is detached by the party receipting, and if payment is received after due date of account, gross amount must be exacted, or if discount is allowed, it must be initialed as authorized by the proper authority. Cashiers accumulate their coupons, and several times each day they are handed over to the adding machine department, sorted into ledger districts, account numbers, etc., and tabulated on the daily cash sheets. Coupons covering payments from branches and bank agencies are mailed to our office daily, and tabulated and dealt with in the same manner as cashiers coupons. When coupons have been tabulated they are distributed to the ledger keepers, who post them to the credit of consumer's account, entering the cash and discount, the total agreeing with their total debit; and they must at the same time verify that the discount allowed at the time of payment corresponds with the discount on the debit side of ledger, any variations being initialed as approved by the proper authority.



Form 10.—Cash Sheet.

At the end of each day, machine operators make a tabulation of the several sub-totals accumulated during the day for each cashier, and cashiers receipts for the day should agree with this total; in any event receiving cashiers turn their money over to the treasurer's department each night, and any differences between cash receipts and cash sheets are checked back and located the following day. This enables us to post our cash receipts to consumer's ledger account the same day as received in our office, including collector's collections for the day; and to do this, it is seldom necessary for our ledger keepers to work more than a few minutes after regular office hours. This method is of great assistance in handling our collections.

(*Continued on page 346.*)

THE AMERICAN GAS LIGHT JOURNAL

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F. A. SOUTHWORTH, - - - - Vice President.
CHARLES H. WADELTON, Secretary and Manager.

SANFORD K. CAMPBELL, Editor.

NEW YORK, MONDAY, NOVEMBER 29, 1915.

Professor Lewes Passes-On.

Professor Vivian B. Lewes, the English authority on gases and gas engines is dead. Professor Lewes was a prolific writer and lecturer, particularly successful in the latter role, and an exhausting investigator in research work. In 1898, while associated with the Royal Naval College, he delivered a lecture before the Royal Institute of British Architects, on Illumination and Ventilation, which brought him prominently before the gas industry. In 1902 he became Gas Examiner to the City of London, having previously been assistant examiner, which position he held at the the time of his death. He took a prominent place in all the gas controversies of the last 25 years, and his influence is seen in all the epoch making changes of that period. In his popular lectures, as well as the many he delivered before the gas associations, he showed wonderful capacity and breadth of interest, treating understandingly such subjects as modern explosives, the theory of the incandescent mantle, the hygenic aspects of gas lighting and gas heating, fuel, carbonization, acetylene, air gas, oil and many others.

His name was and is honored the world over, and the gas industry suffers by his passing.

A. G. I. Board of Directors Meeting.

The meeting of the Board of Directors of the American Gas Institute, held in the Institute office, Thursday, Nov. 11th, 1915, was called to order by the President at 10:30 A.M., with the following present: William E. McKay, president; Geo. G. Ramsdell, secretary; D. D. Barnum, C. O. Bond, R. W. Bush, G. B. Cortelyou, J. B. Klumpp, C. H. Nettleton, Herman Russell and W. R. Addicks, past-president.

The Secretary reported that the agreement of affiliation with the Southern Gas Associations had been completed, making the list of affiliated associations: Illinois Gas Association, Iowa District Gas Association, New Jersey State Gas Association, Pennsylvania Gas Association, Southern Gas Association and Wisconsin Gas Association.

An invitation from the Secretary of State was read by the secretary, notifying the American Gas Institute to appoint one or more delegates to attend the Second Pan-American Scientific Congress, to be held in Washington, December 27th, 1915, to January 8th, 1916, which, upon motion, was accepted and the President asked to appoint a representative and alternative to attend the Congress.

A communication was received from the Society of Technical Associations Secretaries, inviting the Secretary of the Institute to become a member, which, upon motion, was accepted and the Secretary instructed accordingly.

A communication from the American Society of Heating and Ventilating Engineers asked for the co-operation of the Institute. As the objects of the society were not very thoroughly understood, Mr. George S. Burrows was appointed to make an investigation and report at the next meeting of the directors.

A communication from the Panama-Pacific Medal Winners Exposition Association invited the Institute, as one of the medal winners, to unite in the movement for an exposition in the cities of Chicago and New York. The secretary reported that he had replied to this communication, stating that the Gas Congress merely secured and conducted the Collective Gas Exhibit, and, having no exhibit of their own, could not participate.

The matter of the next place of meeting was taken up, the Committee appointed considering that the action taken at San Francisco discharged the Committee, and that the matter was, therefore, referred to the Board of Directors. The President informed the Board that Mr. Paul C. Cummings, representing the Chamber of Commerce of Boston, desired to address the Board on the subject, and, upon motion, he was allowed five minutes for that purpose. After hearing Mr. Cummings, upon motion, the Committee, consisting of W. A. Wood, Chairman; J. B. Klumpp and C. L. Holman, was reappointed, and requested to report at the December meeting of the Directors.

On the matter of reciprocal relations, Mr. Klumpp stated that a meeting of the Joint Committee of the National Electric Light Association, National Commercial Gas Association, Empire State Gas and Electric Association, and the Institute, was to be held the next day. As there was not sufficient time in which to notify the Committee of the Institute, Mr. Klumpp was asked, and consented, to meet the Joint Committee and act as representative of the Institute.

The President reported that he had received from the Independence Inspection Bureau a communication on the Bureau of Standards Gas Code, which was read. After considerable discussion, the communication was referred to Mr. Addicks, Chairman of the Committee on Installation, Regulation and Safety Code, with authority to arrange with the Secretary for publication of the letter in the Institute News.

A communication was received from Mr. H. B. McLean, President of the National Commercial Gas Association, in reference to an article published in the New York "Times," October 30th, by the American Museum of Safety. It was referred to the Chairman of the Technical Committee for action.

The report of the Committee on Chemical Testing Laboratory was read, and, upon motion, the Committee on Central Testing Laboratory was reappointed. The Board than adjourned.

New Jersey State Gas Association Meeting.

The Jersey record for attendance was equalled at the Fall meeting, held at Klein's Hotel, New Brunswick, Tuesday, November 23; as over 50 per cent. of the membership was present, and half the Gas Companies of the State represented. The local agent of the Public Service Gas Company, Mr. W. F. Thomas, and his assistant, W. H. Johns, met all comers with N. J. S. G. A. silk badges of red and black, the colors of Rutgers, the city's college.

Promptly at noon all sat down for luncheon, as guests of the Association, following which the plant of the "Never-Slip" Manufacturing Company was visited, under the guidance of General Manager McCurdy. The New Brunswick district is showing a gain in gas output of from 30 to 60 per cent. a month over last year, and this one plant uses over 6 millions a month, making "Never-Slip" calks for horseshoes, and shipping daily outfits for 100,000 horses or 1,600,000 calks. It employs 850 men, and works 24 hours a day including Sunday. Their biggest contract at present calls for 315 million outfits for the Russian Gevernment.

They make two kinds of calks hard core, and case hardened for snow and hard ground, mostly the former. These have to be carburized, which is done in a battery of 14 American revolving furnaces equipped with automatic temperature control.

Returning to the hotel, President S. J. Franklin called upon S. H. Alexander to read his paper on "The Show Window—Does it Pay?"

The author was convinced that the window does pay, and he gave many timely and valuable hints as to how to make it pay more.

The number of people passing the show-window arranged by J. B. Jones at Bridgeton, described in the JOURNAL, Nov. 15, were counted and found to total 3,000, all in 3 hours, in a town of 14,000 inhabitants. Mr. G. E. Smith said that every live demonstration in Jersey City made direct sales. Others discussing the paper were B. K. Johnson, F. R. Cutcheon, C. H. Butcher, C. W. Hoy, A. Baird, H. H. Newman and J. P. Zingg.

In order that some good results might come from the author's efforts, Secretary O. F. Potter asked how many would make a special window display before Xmas, and many responded.

The other paper, by A. F. Tuttle, consisted of an analysis of heat treatment of steel, with special reference to the installation at the "Never-slip" plant. The features he called especial attention to were the close temperature control, 2° either way from 1,700° F.; the use of a carburizing gas instead of a solid carbon material in the furnaces; and the large consumption obtained by the gas company—6,500,000 a month.

Among others present at the meeting were R. H. Garrison, "Pop" Mason, A. C. M. Azoy, W. S. Barry, W. S. Gribbel, C. E. Bartlett, C. A. Crofut, W. R. Causbrook, T. L. Melick and E. C. Roberts.

The next meeting will be held the latter part of January or early in February.

SPECIAL ENGLISH CORRESPONDENCE.

Monthly Letter From Norton H. Humphrys, Salisbury, England.

THE WAR AND THE UTILIZATION OF TAR.—A VISIT TO AN UP-TO-DATE GAS WORKS AT MANCHESTER.—THE GAS LADY.—DEATH OF PROF. VIVIAN B. LEWES.—MR. CYRIL G. DAVIS ON THE GAS SHOW ROOM.

The action of the Government in restricting the use of crude tar on roads, and the pressure brought to bear on gas undertakings, to induce them to use every available means of increasing the toluene content of the tar, will have a marked effect as regards the treatment of tar in gas works, and in this connection will inaugurate quite a new era. Up to the present time, with the exception of a few gas works of the first magnitude, no attempt has been made to deal with or utilize the tar on the spot, but it has been disposed of in its crude state, often at a merely nominal price; as a general impression existed to the effect that the working up of tar was a somewhat risky process, calling for the application of special care and skill. But there is now a very likely prospect that the tar still, not to say auxilliary rectification stills, will become as general a feature of the gas works plant as the sulphate of ammonia apparatus, and that the engineer of a works making 100,000,000 cubic feet of gas per annum, or more, will as soon think of disposing of his ammoniacal liquor in its crude state as of getting rid of the tar in that form. There is a large and rapidly increasing demand for de-hydrated tar, refined in such manner as to meet the requirements of the Government Road Boards, which simply means that the water and some portion of the light oils must be removed by distillation at a suitable temperature. The distillate flowing from the condenser outlet can be disposed of at a fair price, if not to be dealt with on the spot. One advantage, as compared with existing practice, will be that the 5% or so of ammoniacal liquor, at present retained by and sent away with the tar, for which the purchaser not only refuses to make any allowance, but also frequently claims important rebate, on the ground of "excess of water in the tar," can be separated from the distillate, returned to the storage well, and thus turned to practical account. Hitherto the chief drawback to the utilization of tar at the gas works is that the only pattern of still known, which is called, on account of its shape, the "pot" still, requires special skill in working to avoid troublesome and dangerous priming and boiling over. This is due to the fact that it contains a considerable depth of tar, perhaps 8 feet, and is heated externally at the bottom part. A new device has been placed on the market, and is meeting with good acceptance amongst gas engineers, by which this trouble has been remedied. In place of the "pot" section of still a comparatively shallow rectangular tank is used, in which the tar is treated by a continuous process in such manner that only a small quantity is under treatment at any one time. The depth of the tank is 3 feet, but that of the liquid under treatment is maintained at an even 6 inches, and thus ample precaution against priming is secured. The crude tar is admitted at one end, and a series of baffle plates cause it to follow a tortuous course towards the other, and by the time it reaches the outlet it is converted into de-hydrated tar of the required quality. The rate of feed can be adjusted until the desired temperature is obtained at the outlet. The necessary degree of heat is not supplied at the bottom, or externally, but by means of a series of tubes or flues carried through from end to end and immersed in the liquid. The products of combustion from a gas or a breeze furnace, pass through these flues on their way to the chimney. The incoming tar passes first through the condenser, acting as an efficient cooler (no water is required), and second, through a super-heater, where it is further raised in temperature by the hot de-hydrated tar that is leaving before entering the still.

An excellent example of this and also of other modern developments in gas works, was afforded by a recent visit of the Manchester District Institution of Gas Engineers to the Bradford Road Gas Works, at Manchester, at the invitation of Mr. J. G. Newbiggin, Chief Engineer to the Manchester Corporation Gas Committee. The Bradford Road Gas Works, in view of the fact that it is only one of three stations under the control of Mr. Newbiggin, are on a large scale. The area of ground occupied by them is close upon 53 acres; the amount expended on the site is over £900,000, and the producing capacity is close up to 2,000,000 cubic feet of gas per 24 hours. In respect to this the honors are about equally divided between coal gas and carburetted water gas. Horizontal retorts are in use at these works, and the plant in one of the two retort houses that constitute the producing plant, is in course of reconstruction on that system. There is a complete experimental plant, including every detail, from the retort to the governor, capable of producing and dealing with 60,000 cubic feet of per 24 hours; a sulphuric acid plant, equal to the production of 100 tons per week (120° Twaddell), which also utilizes the waste gases from the sulphate of ammonia saturators; a continuous process plant for extraction of toluene, and a coke breaking and screening plant. The toluene set is capable of dealing with a maximum of 8,000,000 cubic feet of gas per 24 hours, and includes 6 tower scrubbers, each 55 feet high and 7½ feet in diameter, and the gas passing through these, is washed with a suitable oil. When satuated, the oil is conveyed to stills, heated by means of wet steam, with the result that crude naphtha, containing all the toluene, is separated from the bulk, which can then be used again, for the treatment of a further quantity of gas.

The existing clumsy and wastefull method of extracting Toluene, by washing with crude coal gas tar, the only advantage of which is that it is a rough and ready expedient adaptable to existing apparatus at a few hours notice, will soon make way for a special process, such as that adapted at the Bradford Road Gas Works, of washing the gas with a suitable light oil, such as could be extracted from the crude tar by means of the de-hydration apparatus above described. As not more than one-third of the constituents of the crude tar is of any use for absorption of toluene, the tar-washing means the handling of three times the quantity of liquid actually necessary.

Another innovation, for which the present unfortunate condition of public affairs is also responsible, and which, like the process above described, is likely to be retained, to a large extent at any rate, as a permanent institution, is the increasing prominence of the "Gas Lady," who was already in existence on a small scale, as inspector or instructor in connection with gas cookers, or in the show room, but has now extended her sphere of operations to house-to-house visitation, for meter inspection, or maintenance of incandescent gas burners, etc., and as a result, now comes more prominently before the public eye. It is scarcely necessary to say, that she is replacing young men who have entered upon active military service. A leading "Daily" recently remarked: "Women have taken to the work of inspecting gas meters with an enthusiasm which has prompted the South Metropolitan Gas Company to increase its staff of women and girls, from a mere handful a few months ago to over seventy employed on this or other work. A further experiment has now been decided upon. By paving a fixed sum per quarter, consumers can have their incandescent burners kept in order, and renewed when necessary, and women are being trained to undertake this service." Another newspaper goes into more detail, as follows: "In their neat navy blue uniforms, comprising blue serge three-quarter length coat, short skirt and small navy blue hat with ribbon band, a leather haversack slung over their shoulders, the "gas ladies" (meter inspectors), are among the smartest looking of the growing army of uniformed women official which the war has called into service." The services of women are also being largely utilized in connection with gas undertakings, both in London and the provinces, as clerks, collectors, street lamp inspectors, lamp lighters, etc.

The gas industry, in common with a very large circle comprising all who are interested in applied chemistry or chemical engineering, have sustained an irreparable loss by the painfully sudden and untimely decease of Professor Vivian B. Lewes, at the age of 64 years, a period of life that falls somewhat short of the allotted span, and therefore affords reasonable promise of some years of useful work, on the basis of accumulated experience. He literally died in harness. A severe cold did not deter him from leaving his home in London on a journey into Wales, for the purpose of filling a lecture engagement, but on arrival at his destination, he was found to be so seriously ill as to necessitate immediate medical attention, and notwithstanding all that could be done, double pneumonia developed and death followed within four days. He was known to all interested in the gas industry as an eloquent and accurate demonstrator and exponent of science truths, having been accustomed, over the last 20 years, to deliver lectures on questions of the day, on the platforms of the Institution of Gas Engineers and of the District Associations. A pleasing and kindly personality, a rich fund of native wit and humor, a good presence, an excellent delivery, an ability to adapt his subject to suit the capa-

bilities of any class of audience, and last, but not least, such a thorough and complete grip of the matter in hand, that notes or MSS. were an absolute superfluity, constituted a rare combination of talent and ability, and rendered him the leading science lecturer of the day. His latest work in connection with the gas industry, was a series of lectures delivered in different parts of the country, under the auspices of the British Commercial Gas Association, dealing with the combustion of gas from a hygienic aspect; in which he completely disposed of the statements that have been put forward by interested parties, to the effect that the use of gas in the house is a risk and danger to the health of the inmates. For over 20 years he held the office of Chief Gas Examiner to the City of London. He has rendered yeoman service to the gas industry, by powerful advocacy in favor of the calorimeter as the legal instrument for testing the value of the gas supply, on behalf of the consumer. He was also very much in request as a professional witness. In addition to these and many other outside engagements, he found time for an enormous amount of work in the privacy of his laboratory and library. He was an active worker and investigator, the author of many valuable text books, such as a treatise on "Acetylene," a work on carbonization, etc. As Professor of Chemistry at the Royal Naval College at Greenwich, he acquired a high reputation as an authority on explosives, calorific power of fuels, and similar subjects, and in that capacity rendered important service to the government.

Prominent attention has been attracted to an article in the *Journal of Gas Lighting*, written by Mr. Cyril G. Davis, Managing Director of the Davis Gas Stove Company, whose elegantly appointed and highly artistic rooms, situated in a leading thoroughfare in the best part of the Metropolis, are a standing advertisement of special ability, on the part of the author, to deal with the subject of "Gas Company showrooms." Mr. Davis submits that if a thing is worth doing at all, it is worth doing well. A dirty, badly arranged, or shabby showroom is worse than none at all. A hot and malodorous atmosphere, or old fashioned shop soiled stock, is not likely to encourage the use of gas or the sale of gas appliances. The article may be especially recommended to the consideration of gas company directors, who are too prone to regard the showrooms as a sort of fill-up-time job for the already fully occupied out-door staff. The department should be under the control of a fully qualified and adequately remunerated official, who should be at liberty to devote regular daily attention to it, not only at odd times when other work is slack, as is too often the usual condition of things. This is particularly necessary when the showroom is (as it should be) situated in the principal shopping or business part of the district, and therefore not under immediate managerial supervision. Neglect of these matters is the explanation of the many indifferent gas showrooms that are to be seen in all parts of the country, especially in the smaller towns. We must remember that a successful showroom is worked more on the lines of an item in the expenditure for advertisements, than as an additional profit earning branch, although it is quite possible to run it on up to date lines, and at the same time, more than cover the expenses.

Who Am I?

November "Safety News," a monthly publication of the United Gas Improvement Company, quotes the following from a bulletin of the Illinois Steel Company:

I am more powerful than the combined armies of the world.

I have destroyed more men than all the wars of the world.

I am more deadly than bullets, and I have wrecked more homes than the mightiest of siege guns.

I steal, in the United States alone, over $300,000,000 each year.

I spare no one, and I find my victims among rich and poor alike; the young and old; the strong and weak, widows and orphans know me.

I loom up to such proportions that I cast my shadow over every field of labor from the turning of the grindstone to the moving of every railroad train.

I massacre thousands upon thousands of wage earners in a year.

I lurk in unseen places, and do most of my work silently. You are warned against me, but you heed not.

I am relentless, I am everwhere, in the home, on the streets, in the factory, at railroad crossings, and on the sea.

I bring sickness, degradation and death, and yet few seek to avoid me.

I destroy, crush or maim; I give nothing, but take all.

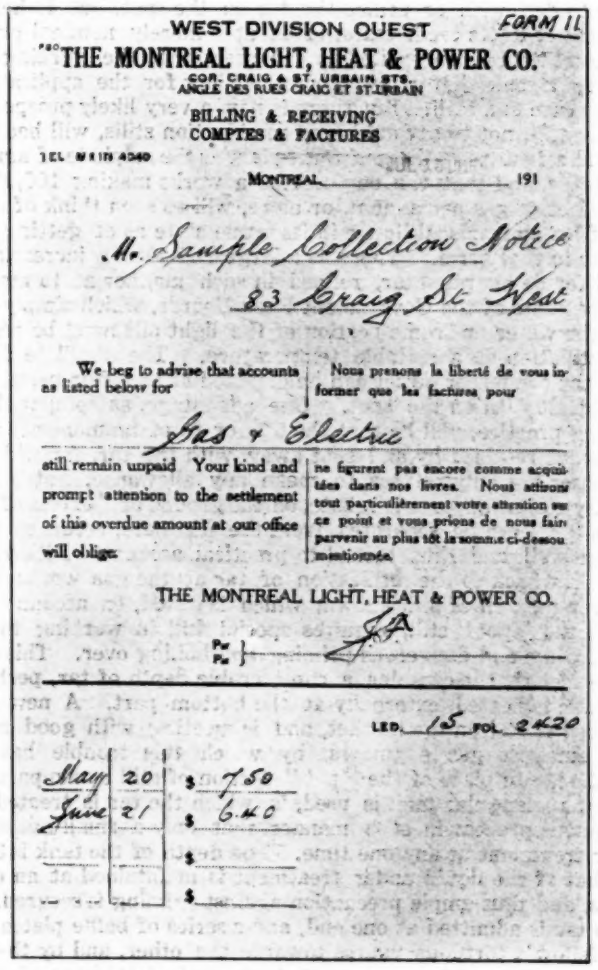
I am your worst enemy. I AM CARELESSNESS.

(*Continued from page 343.*)

Routine of Billing and Receiving Department.

Credit Sales, Sundry Bills, Credits, Etc.—We render separate bills for goods supplied or work done (such as gas products, coke, tar, etc., piping, lamps, gas appliances, etc., not sold on rental plan), and these charges are debited on consumer's regular ledger sheet, the details being journalized and summarized on sales or summary sheets.

Credits are handled the same way as cash receipts, and if a corrected account is necessary we make a practice of cancelling the total of the original bill and rendering a corrected bill. We, of course, keep sundry debits and credit sales or summary sheets for retakes, final bills, etc.



WEST DIVISION OUEST FORM 11

THE MONTREAL LIGHT, HEAT & POWER CO.

COR. CRAIG & ST. URBAIN STS.
ANGLE DES RUES CRAIG ET ST-URBAIN

BILLING & RECEIVING
COMPTES & FACTURES

TEL. MAIN 4040

MONTREAL, 191

Mr. Sample Collection Notice

83 Craig St West

We beg to advise that accounts as listed below for | Nous prenons la liberté de vous informer que les factures pour

Gas & Electric

still remain unpaid. Your kind and prompt attention to the settlement of this overdue amount at our office will oblige. | ne figurent pas encore comme acquittées dans nos livres. Nous attirons tout particulièrement votre attention sur ce point et vous prions de nous faire parvenir au plus tôt la somme ci-dessous mentionnée.

THE MONTREAL LIGHT, HEAT & POWER CO.

Per
Pp

LED. 15 FOL. 2420

May	20	$ 7.50
June	21	$ 6.40
		$
		$

Form 11.—Collection Notice and Card.

Collections.—With our system of collection we work direct from the ledger account, the routine being as follows:

(a) A meter reading district falls due each day of the calendar month, and approximately 5 days after due date, collection clerks send notices (Form 11) to delinquent consumers direct from the ledger; the ledger sheets show at a glance the consumer's past record in regard to payments, etc.

(b) Five days after the notice is sent, clerks again go through the ledgers, and transcribe outstanding items to collection cards, this card being practically a duplicate of the ledger account, showing the consumer's classification as to credit, past record of payments, etc. The notations under the heading "Remarks" on the sample ledger and collection card, are explained as follows:

1-5/4/15 means first collection notice sent.
X-5/5/15 means final or cut-off collection notice.

If there is any dispute or other reason for holding up settlement of the account, notation is made on the ledger account and collection card, accordingly.

(c) Collection cards are sorted into collection districts and handed over to the collector, who must either collect the outstanding indebtedness, cut off the service or report the reason for not doing so, within a limit of 10 days. To keep a record of cards issued,

and to insure that they are properly dealt with and returned, we stamp on back of the card the date it is issued to the collector, and also make a tabulation of the ledger and account number of the cards issued to each collector from day to day. This tabulation is readily made on a split adding machine. The collector initials the list, as having received the cards, and the clerk in charge of collections must see that cards are checked off as returned paid or reported upon, and follow up any cases where collector is negligent in carrying out instructions. When the indebtedness on the card has been paid, they are turned over to the collection clerks, who verify that the payments reported have been properly posted in the ledger, and card is then returned to its proper place for use the next month.

FORM 12

THE MONTREAL LIGHT, HEAT & POWER CO.

COR. CRAIG & ST. URBAIN STS.
ANGLE DES RUES CRAIG ET ST-URBAIN

BILLING & RECEIVING
COMPTES & FACTURES
WEST DIVISION DIVISION OUEST

TEL. MAIN 4040

MONTREAL, _____ 191

Mr. Sample Collection Notice
83 Craig St West

We beg to advise that you have omitted to settle your account rendered for

Gas + Electric

as listed below, and unless settled immediately at our office, we shall be reluctantly compelled to enforce our rule of disconnection.

In the event of service being disconnected for non-payment, all outstanding accounts together with the sum of $1.00 will have to be paid before service can be reconnected.

Nous prenons la liberté de vous aviser que vous n'avez pas encore acquitté notre facture pour

tel que détaillé ci-dessous, et qu'à moins de paiement immédiat, nous nous verrons dans l'obligation de vous appliquer notre réglement prévoyant la cessation de votre service.

Si parce que nos factures sont demeurées impayées, nous interrompons votre service, toutes les factures en souffrance, ainsi que la somme de $1.00 exigée pour le nouveau raccordement, devront être payées avant que le service puisse être rétabli.

THE MONTREAL LIGHT HEAT & POWER CO.

Per
Per

LED. 15 FOL. 2420

May	20	$ 7 50
June	21	$ 6 40
		$
		$

Form 12.—Collection Notice and Card.

(d) When service has been cut-off for non-payment we notify Service, Complaint and Record department, and also send consumer written notice that unless the indebtedness is paid at our office within five days, the account will be placed in the hands of our attorneys for collection. If this does not bring the desired result, collector makes final application for paymment, and if not successful, reports back to the arrears department, and the matter is then forwarded to our attorneys for collection; provided, of course, the consumer has not made some satisfactory arrangement in the interval.

In regard to our collections, I might state that our "cut-offs" during the present depressed period increased over 100%, and as this condition effected our revenue, and as a great many consumers are delinquent owing to stress of circumstances consequent on the war, we have recently adopted the practice of removing the ordinary meter and installing a pre-payment meter; and while we do not advocate the use of slot meters during normal times, we find we are conserving considerable revenue by this procedure, that would otherwise be lost to the company, and at the same time we are giving deserving consumers a chance to make good. In such cases we agree to accept payment of back indebtedness in small monthly installments.

Audit and Accounting Department.—This department deals only with totals, as far as income is concerned, the billing and receiving department furnishing a statement of gross income each month, accumulating on the statement the details and totals from the several ledger districts; and the outstandings or accounts collectable of consumers' ledgers must agree with the accounts collectable in general ledger. The monthly statement of gross income is certified correct by the manager of the Billing and Receiving department, and is checked by Audit department.

Cash receipts, bank collections, etc., are posted to general ledger direct from treasurer's department cash book, and billing department cash sheet totals must agree with treasurer's cash book totals.

We have also a system of audits whereby all ledger postings are checked from the summary or sales sheets to the consumers' ledgers. Also, as mentioned above, when dealing with the matter of routine

Form 13

F-82

The Montreal Light, Heat & Power Company

Sample Collection Card D

24 St Urbain St West

4510

Jany	31	G.E	10	50	X-25/2/15
Feb	28	"	9	60	X-25/3/15
March	31	"	8	70	X-25/4/15
April	30	"	7	80	X-25/5/15
May	31	"	6	90	X-25/6/15
June	30	"	6	30	X-25/7/15

Form 13.—Collection Notice and Card.

of orders, the quadrouplicate copy of all orders issued is forwarded to the Audit department, which, within approximately 60 days from date order is issued, makes an audit to determine that the meter and billing sheets have reached their proper location in meter books and ledgers, and that the consumer is being billed for the service. This system of audit also insures that all orders issued are properly executed by departments concerned, and that returns are made and posted in the income books of the company.

In this paper I have dealt only with the general routine of the system, there being numerous details, and other work, such as posting orders for changes of meters, notices for changes of tenant, etc. The main features of our system are, that once the service has been established, the Billing and Receiving department deal direct with the consumer in all matters pertaining to their accounts, and we have endeavored to save any duplicating of records such as transcribing meter readings, etc., thereby saving a great deal of clerical labor.

THE plant improvements of the Newport (R. I.) Gas Light Company are well underway, and a much improved service is promised its consumers. It is understood that there will also be a reduction in price by next summer. President A. K. Quinn has given much thought to the matter, and the new plant will be a model.

Industrial Fuel Data.

The National Commercial Gas Association has fulfilled its promise made early in the year, to present to the industry pamphlets covering the utilization of gas in various industrial and manufacturing processes. The Industrial Fuel Information Pamphlets now available have been prepared by the Committee on Development of Industrial Fuel, and marks an epoch in industrial gas development.

Many have felt the need of reference bulletins containing data covering cost of operations, methods and appliances used in various manufacturing processes, and it was realized that they would be of inestimable value to the industrial fuel specalist in aiding him to approach his problems with understanding and authoritative knowledge.

The Committee on the Development of Industrial Fuel decided to make a start in filling this want, and after devoting much time, perseverence and research to the work have the following bulletins ready, which will be on display and for sale at the Convention in Washington and at Association headquarters thereafter.

Pamphlet No. 1.—Application of Gas to Dry Room Equipment.
Pamphlet No. 2.—Application of Gas to Japanning and Lacquering.
Pamphlet No. 3.—Application of Gas to Steam Boilers.
Pamphlet No. 4.—Application of Gas to Metal Coloring.
Pamphlet No. 5.—Application of Gas to Soft Metal Melting.
Pamphlet No. 6.—Application of Gas to Hotel and Restaurant Equipment.

These pamphlets should prove an invaluable aid to industrial fuel specialists in securing desirable business; they contain all the available informotion covering their respective subjects regarding good practice, appliances, the names of the appliance manufacturers, etc.

As advertising material it is believed that they are unsurpassed. The information they contain is of such importance that they should be in the hands of every factory owner, manager, superintendent, foreman and mechanic interested in the subjects. In addition to being valuable reference works they will help educate the gas company's prospects to the advantages of gas fuel in the industries.

The Association is particularly proud of the beginning made, and feels that gas companies will embrace this opportunity to increase the value of its service to the various industries in its territory.

The pamphlets will be sold at the following prices; orders should be sent direct to the headquarters of the Association, 61 Broadway, New York, N. Y:

From 1 to 100 copies,	
Pamphlets Nos. 1, 4, 5 and 6.....	$ .20 each
Pamphlet No. 2.....	.30 each
Pamphlet No. 3.....	.50 each

A discount of 10% will be allowed on all orders for more than than 100 and less than 500 assorted copies; 15% on orders for more than 500 assorted copies. Prices are f.o.b. New York.

Safety and Lighting.

"A Code of Lighting for Factories, Mills and Other Work Places," by C. E. Clewell, Assistant Professor of Electrical Engineering, University of Pennsylvania, is an instructive and exhaustive paper on lighting, both natural and artificial, in which the important part this facter plays in the elimination of the accident harard is clearly brought out.

Prof. Clewell urges auxiliary lighting, by which many accidents will be avoided. The necessity of good lighting, for the eyes, both by means of proper illumination and protective eye glasses, is also insisted upon. The paper was read at a joint meeting of the Philadelphia Section of the American Institute of Electrical Engineers with the Illuminating Engineering Society at the Engineers' Club, 1317 Spruce street, Phizadelphia, and is worth a careful perusal.

Mr. T. J. Litle, Jr., a member of the Illuminating Engineering Society, commenting on Professor Clewell's paper spoke as follows:

"To my mind, this is one of the most important subjects taken up during the past year by the Engineering Society, and, no doubt, marks a new era in engineering circles, in that it directly concerns mechanical and electrical engineers and architects, bringing them shoulder to shoulder with the illuminating engineer, which profession is rapidly growing in importance.

"In reviewing the Code, I am interested in Article 11, page 4, regarding auxiliary lighting; in which reference is made to the desirability of providing a dual system of lighting. I know there will be much debate on the desirability of such an arrangement, but we have to consider this matter in a broadminded fashion. There is, to my mind, no such thing as absolute perfection in any lighting system, and in places where large numbers of people congregate or are employed, extra precaution should be taken to see that the lighting system is so arranged that there can be no general outage, which is apt to result in a panic, and which is always serious.

"Great strides have been made in the Safety First propaganda. We have succeeded in bringing down accidental injuries in our great industrial plants to a surprisingly low figure, and it has not necesitated taking any radical step, or interfering in any way with the general operation of the plant or with efficient production and operation.

"We have dwelt at considerable length on the necessity for adequate lighting, and have shown conclusively that better work can be produced where ample illumination is provided; we have tried to guard against eye-strain, but we have not paid sufficient attention to this matter of auxiliary lighting. There are some great corporations that recognize its importance, and have provided both gas and electric lighting systems to be operated simultaneously, so if one should fail, the other would furnish sufficient illumination to prevent possibility of panic. Some department stores have also considered this matter in the same way, and have provided standardized fixtures in which gas lamps are used in one bay and electric lights in the adjoining bay, and the layman would never suspect that different systems of lighting were used.

"In view of the fact, as I have just mentioned, that great stress has been laid upon the importance of observing the minutest detail in plant lighting, it would seem wise to insist upon continuous illumination in such buildings, and I expect this to be one of the most important "Safety First" movements during the coming year; and I believe that legislation should be enacted making dual lighting compulsory in such cases."

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,153,911. Gas Analyzing Apparatus. J. W. and C. W. Hays, Chicago, Ills.
1,153,912. Gas Absorbing and Indicating Apparatus for Gas Analyzers. J. W. and C. W. Hays, Chicago, Ills.
1,153,932. Packing Box for Mantles, etc. E. L. Knoedler, Gloucester City, N. J., assignor to Welsbach Light Co., same place.
1;153,969. Gas Lighter. E. H. Sturts, Philadelphia, Pa.
1,154,064. Device for Securing Bells, Globes, Chimneys, or the like, to Lamps. Ludwig Severin, Hagen, Germany.
1,154,177. Valve for Gas Burners. F. V. Detwiler, Grand Rapids, Mich.
1,154,421. Burner Tip. H. Lyon, Gloucester City, N. J., assignor to Welsbach Light Co., same place.
1,154,455. Method of Producing Combustible Gases. H. Strache, Vienna, Austria-Hungary.
1,154,561. Gas Shut-Off Valve. G. L. Burlingame, Chicago, Ills.
1,154,792. Apparatus for Analyzing Gases. O. Matzerath, Aachen, Germany.
1,154,858. Process and Substance for Purifying Gas. J. C. Heckman, Avalon borough, Pa.
1,154,859. Gas Purifying Material. J. C. Heckman, Avalon borough, Pa.
1,154,896. Meter System. J. A. Tilden, Boston, Mass.
1,155,114. Gas Burner. Gerritt Van Daam, Buffalo, N. Y.
1,155,257. Automatic Gas Cut-Off. A. W. Marcille, Thorold, Ontario, Canada.
1,155,283. Gas Heater. G. E. Sharpe, Steubenville, O.
1,155,385. Method of Producing Ammonium Sulphate (a method of purifying gases of carbonization). F. Tschudy, Fairfield, Ala.
1,155,386. Saturating Apparatus. F. Tschudy, Fairfield, Ala.
1,155,387. Tar Extractor. F. Tschudy, Fairfield, Ala.
1,155'4I6. Device for Controlling the Supply of Gas to Burners. C. W. Harrison, New York City.
1,155,526. Coke Oven. L. L. Summers, Chicago, Ills.
1,155,630. Burner for Gas and Similar Radiators, Stoves and the Like. A. B. Walker, Wallsend, England.

Meeting of the German Gas and Water Association.

The German Gas and Water Association held a meeting in Berlin, in June, in place of their annual meeting. No papers were read. There were about 250 persons present, and the chair was taken by President, Herr Reese. of Dortmund. Dr. Karl Bunte, the Secretary, was at the front, and his place was taken by his father, Professor H. Bunte. Greetings were exchanged with the Swiss Gas Association. Herr Hase, Manager of the municipal gas, electric and water works, in Lübeck, was elected president for the coming year; and F. Reese (Dortmund), H. Prenger (Cologne), and M. Sorge (Thorn), vice-presidents. The Bunsen-Pettenkofer medal was awarded to Professor von Gruber (Munich), for his researches into the hygienics of gas lighting.

One of the questions discussed was: "What has been the experience in employing prisoners of war in gasworks?" Herr Martin (Erfurt) said the experiment had been made, with results on the whole satisfactory, although it took about 20 men to do the ordinary work of 14. More work was gotten out of them by raising the very low rate of pay (15 cents per week). Herr Gadamer (Berlin), said the Russian and French prisoners worked better when their pay was raised; and the president noted the same result in employing laborers at collieries.

The place of next year's meeting was not decided. There was no discussion on any of the committee reports, and the session lasted only an hour and a half.

The report of the Council says one effect of the war has been that both the public and the Government are thoroughly awakened to the national importance of the gas industry. The dearth of petroleum has led local authorities to push the use of gas, by reducing the price, by putting in services free, or on a hire system, by installing slot meters, etc. By-products have also become of greater importance for fertilizers and for the manufacture of explosives.

The Hygienic Institute of the University of Munich, under Professor von Gruber, has studied the hygienics of gas lighting, and has reached results very favorable to gas, even for small rooms. The work of the committee on pipes, including high pressure supply, has been pushed forward. The committee on escapes of electric currents has done some work, but will have to wait; as will that of the committee on connecting lighting conductors to mains. The extensions to the research station was arrested by the outbreak of the war, but it has been very busy under Dr. Terres, and the general supervision of Professor Bunte.

The statistics that the Association collects each year were this yeár contributed by 394 works, instead of 441; those that did not reply being chiefly small works. Only 44 works show a loss in output for the year; and in these the falling off is mostly in gas used for lighting. In other cases where there was a less consumption for lighting, it was more than made up for by the increase in gas for other purposes.

New Methods and Appliances.

COKE QUALITY.—A recent issue of "Feuerungstehcnik" contains the results of an investigation by Thaler. Foundry and blast furnace cokes are differentiated in practice, but very little difference can be found between them. Coke for foundries should be the largest and best pieces, and should contain less moisture and sulphur than blast furnace coke. A table showing the quality of coke required by the German Foundrymen's Association is given. This allows a moisture content of 5%, but in the author's opinion this is too high. The moisture content is largely dependent upon the physical structure of the coke, a good hard quality carries less moisture than a softer coke. The phosphorus in the coke is taken up by the iron, and it is desirable, therefore, that the phosphorus should not exceed 0.04 to 0.05%.

In classifying cokes, the physical properties, as well as the chemical composition, should be taken into account. The principal points to be considered are:

(1) First-class coke—Silver white lustre, sinewy structure, dense, firm, with a metallic ring, resistent to pressure; it should not break into small pieces on falling, and should not contain more than 8% ash, 3.5 to 4% moisture, and 0.8% sulphur.

(2) Second-class coke—Faint white to dark lustre, structure more boney and porous; less resistance to pressure and heavier than coke of Class I. It should not have more than 10 to 11% ash, 8 to 9% moisture, and 1 to 1.1% sulphur.

(3) Third-class coke—Lustreless, grey-black fracture, soft, breaking easily when struck; the individual coal particles are easily distinguished; it is highly porous, and holds water tenaciously. It has a low density, 9 to 9.5% ash, 13 to 15% moisture, and 1% sulphur.

The importance of proper sampling is strongly emphasized.

It is interesting to compare the above with "the conditions that ought to be fulfilled by a coke to be employed in the melting of iron," according to Anderson, in his "Chemistry of Coke" The following is his specification:

(1) 1.1% sulphur.
(2) 0.018% phorosphorus.
(3) 4% water.
(4) 9% ash
(5) 6% dust (on delivery).

} maximum.

(6) 40 to 50% pore space (in foundary coke 25 to 40%).
(7) The coke must possess a hardness of 80 kilos. per square centimetre.
(8) The weight of 1 cubic centimetre of the coke (dried at 100° C.) should be 0.8 to 0.9 gramme.

Day and Night at the Exposition.

The wealth of arthitectural beauty at the San Francisco Exposition was brought to view by night in a manner more striking, and even more beautiful, than under California's proverbial sunny skies. By using high pressure gas units it was possible to obtain color effects and distribution of light that blended perfectly with the fine examples of art-craft in line, color and detail, which will always be remembered as a feature of the Panama Pacific Exposition. The illustration shows a street in the States and Foreign City section, from which some idea may be had of the successful results.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Quincy Gas, Electric and Heating Company has petititioned the Illinois Commission for permission to continue the use of prepayment gas meters and to continue to charge for this service at the rate of $1.10 the 1,000 cubic feet. The petitioners state they would prefer a discontinuance of this service, but if they did so it would deprive a large number of consumers of the use of gas. There has been, according to the petition, no complaint made against the rate charged, and the company, because of expense of installation and maintenance and occasional loss by breaking and theft and more frequent collections, is obliged to charge 10 cents additional to what is charged for the gas supplied through regular meters. The city has asked the commission to compel the company to supply gas through slot meters at the same price as through other meters.

THE Oklahoma Gas and Electric Company, Oklahoma City, Okla., recently offered prizes of $25, $15 and $10 for the three best essays on the subject "Is Municipal Ownership of Utilities in the Best Interests of Wage Earners and Their Families." Conditions of the contest limited contestants to employees, not executives, department heads or assistant department heads, and the winning papers were judged for originality, facts based upon personal observation and experience, and other facts and figures to support arguments. The prizes were won by George B. Saunders, clerk; Jos. D. Walker, stenographer; and J. M. Galbraith, lineman.

THE Lebanon (Pa.) Gas and Fuel Company announces new rates to take effect January 1st, 1916. Last year the base rate was reduced to $1.50 per 1,000, and this concession brings it down to $1.30. The new rates are:

First 2,000 feet at	$1.30
Two to five thousand at	1.20
Five to ten thousand at	1.10
Over ten thousand at	.90

Bills will be rendered at 10 cents more than these figures and that discount allowed on bills paid within 10 days.

LOCAL rumors that the new holder of the Lynn (Mass.) Gas and Electric Company had sunken about half a foot, were promptly denied by Francis Drake, manager of the gas department. Quicksand under the tank and the recent dredging of the harbor, undermining the tank's foundations, were ascribed as causes of the supposed sinking. The gas company do not know how the rumor started, and say there is no foundation for such a report.

A COMMITTEE of representative chemists, engineers and technical men from the principal industrial centers in England, has been invited by the British Association for the Advancement of Science to make a study of and report on the question of national fuel economy. The more important considerations will be the proper utilization of coal and smoke prevention.

JAMES H. JOURDAN, President of the Brooklyn (N. Y.) Union Gas Company, told stockholders at the annual meeting, that the gas output shows an increasing tendency, and the company for the calendar year 1915 will save approximately $700,000 in operating expenses through the low cost of gas oil under a contract made late in 1914.

FAILURE of L. H. Burnett to show good faith in the execution of the gas franchise recently granted him by Pullman, Wash., was the occasion for a warm session in the city council. The 60-day time limit set by ordinance for the beginning of construction work has expired, and some councilmen contended that the franchise should be revoked. After a lively discussion, the council voted, 3 to 2, to give the grantee more time.

WASHINGTON (D. C.) papers announce that the Potomac Electric Power Company has filed a proposed schedule with the Public Utilities Commission, which will enable it to compete with gas for heating purposes. The rate will be 3 cents per k.w.-hour after the first ten; with separate meters for light and heat, and a minimum of $1 on each meter. Statistics compiled by the municipal authorities in Spokane show that electric power companies in order to compete with gas companies, must sell their service at 3.40 cents per kilowatt hour where the gas companies are charging $1.50 per 1,000 cubic feet; at 2.83 cents per kilowatt hour where gas is $1.25 per 1,000, and 2.27 cents per kilowatt hour where gas is $1 per 1,000 cubic feet.

THE Gas Machinery Company has the contract for a new 8-foot water gas set for the North Adams (Mass) Gas Company. The new generator house will be 60′ x 30′.

THE Columbus Gas Construction Company of Milwaukee, Wis., has made application for a franchise for the establishment of a gas plant at Victoria, Tex. Under the provisions of Victoria's charter a franchise must be submitted to the people, and an election will likely be called, as the business interests are eager for the establishment of the plant.

THE Public Service Commission is preparing to reduce the rate for gas in the district served by the Kings County Lighting Company in South Brooklyn, N. Y., where the charge is now 95 cents per 1,000. The Legislative Committee inquiry brought out that proceeding had been pending since October 4, 1910, when the first hearing was held by Commissioner Bassett, and that in July, 1911, Commissioner Maltbie took up the matter and put through an order calling for a reduction on a sliding scale from 95 cents immediately to 80 cents in three years. The company defeated this order in court and the new investigation was begun. Commissioner Maltbie arranged with the company for a voluntary reduction to 95 cents, which rate still prevails.

THE new 750,000 cubic foot holder of the Calhoun County Gas Company at Battle Creek, Mich., is completed and in service. The foundation for the new coal gas plant is ready, and the steel and concrete structural work will be commenced at once.

ACCORDING to L. G. Treleaven, Receiver of the Consumers Light, Heat and Power Company, of Topeka, Kas., it will be impossible for the local company to supply more than 50% of the gas needed in the city this year. "The public should not be unwarned. So much publicity has been given the shortage, it seems that every man in the city ought to be prepared for the situation. There is nothing new I can say on the situation. There is not enough gas in reach of the Kansas natural's lines and that's all there is to it." Hard luck for Topeka to have to go back to solid fuel!

HERE is another town in better luck, because they have a manufacturing plant. "St. Joseph, Mo., may have to begin using manufactured gas to-day unless the conditions that have prevailed for the last 2 days change. The natural gas pressure dropped to 4 pounds yesterday and to 3 pounds the night before, whereas the usual pressure is anywhere from 10 to 60 pounds. The storage supply of gas here was reduced by 1,000,000 cubic feet yesterday, which means that nearly all the gas used by the city had to be taken from the big tanks, and that but little was available from the pipe line."

JAMES L. STONE, business manager of the Mansfield (O.) Gas Light Company, was the winner of a second prize in a written efficiency competition for prizes aggregating more than $3,500 by employees of the Doherty organization. His paper was on the subject of "How to increase the gas output." There were 234 papers submitted by employees of the organization, representing every branch of the public service field.

PRESIDENT M. W. STROUD, of the American Gas Company, who, with a party of directors, has just completed inspecting the operating properties of the company, says that even with the dull business that has prevailed until recently in the communities served, the increase in earnings has been remarkable. With a complete return of normal conditions in Illinois, Iowa and Indiana, a much greater improvement should be shown in earnings of the subsidiary companies. The plants controlled by the company were found to be in excellent operating condition.

THE Boston, Mass., "Post" says: "Ever since the formation of the New England Manufacturing Company, the subsidiary of the Massachusetts Gas Companies established to manufacture acid to be used as the bases for explosives, the street has been wonder-

ing who owns the stock. One half, it is stated, is owned by the Massachusetts Gas Companies, whose by-products furnish the material from which the acid is made. The ownership of the other 50% is a mystery. The gas company officials, upon request for information, have maintained a discreet silence, and there has been no "leak" from other sources.

THE Sangamon, Ills., Circuit Court has granted a stay of the Utilities Commission order reducing the rates charged for gas in Belleville, pending appeal by the gas company to the higher court. The court's decision allows the company to collect its bills at the old rate until the final court decision is reached.

ACCORDING to report filed with the City Council of Ypsilanti, Mich., the municipal gas plant has earned during ten months under municipal control $16,859.65 above all running expenses. Bond interest and fee amount to $7,820, which leaves a net profit of $9,039.36. The plant has been under the same management as before it was purchased by the city, G. H. Hubbard being superintendent.

THE agitation for better service in Charlotte, Mich., has finally crystallized into definite action. The Charlotte Women's Club has presented the following petition to the City Council. "We, the undersigned members of the civic committee of the Charlotte Women's Club, respectfully petition your honorable body to take steps to improve the quality of the gas being sold for household purposes. The local service has reached a stage beyond individual complaint, and we believe it within the prerogative of the city government to take cognizance of this situation, inasmuch as the gas company is a public utility corporation and operating under certain grants given by the city. We submit this is a matter of deep concern to a great many of our people, and especially the women of Charlotte, and we most respectfully request your honorable body to officially bring this matter to the attention of the gas company to ascertain if the situation can be relieved."

THE isolation hospital building committee, Gardner, Mass., is negotiating with Gardner Gas Light and Fuel Company for putting in an auxiliary heating plant at the hospital on Temple street. The gas company wants a guarantee of $1,500 on a five-year contract for gas, but the committee is opposed to making any guarantee for gas consumption.

THE Salt Lake City division of the Utah Power and Light Company recently inaugurated the post-card system of billing single-meter customers. Customers having more than one account, constituting about 10% of the consumers, will receive their bills in envelopes as heretofore.

THE Clinton, N. J., Town Council has been advised by the New Jersey Gas Company that it is willing to extend its mains from Flemington to Clinton, providing the residents will pay for one-fourth of the cost of installation.

UTILITIES COMMISSION NEWS.

INVESTIGATING THE NEW YORK COMMISSIONS.—Elimination of the present members of the First District New York Public Service Commission, including William Haywood, Republican and appointee of Gov. Whitmam, is to be strongly urged by the Thompson legislative investigating committee.

The committee's presentment against the Commissioners, it is understood, will be so damaging that it will be almost impossible for the Governor to exonerate the commissioners, as he did after the last investigation.

Ownership by certain commissioners of stock in public utility corporations that are under their official jurisdiction, and evidence that members have voted on certain proposals in a manner promoting their private interests, will be basis of the recommendation for their removal.

The committee is believed to be aiming its biggest gun at Chairman Edward E. McCall particularly, because of his ownership of 387 shares of stock in the Kings County Lighting Company.

Commissioners Robert Colgate Wood, J. Sargeant Cram and Geo. V. S. Williams also are said to be slated for removal from their $15,000 jobs. The Thompson report will be submitted in January or February.

A member of the committee said that before the investigating body finished its task, the people of New York city would be startled by revelations of an unsuspected character.

Senator Thompson and his colleagues are still indignant over the action of Governor Whitman last winter, in clearing the Public Service Commissioners after directing that a rigid inquiry be held. The executive is understood to have insisted on an indictment on which the commissioners could be removed.

FIXES MINIMUM AT TWENTY-FIVE CENTS.—In an order signed Oct. 6 the Public Service Commission of Washington holds that the minimum charge of 50 cents for gas by the Seattle Lighting Company is unjust, unreasonable and excessive, and a minimum charge of 25 cents is substituted as being a reasonable and sufficient charge.

In the opinion and valuation findings of the Seattle Lighting Company, published by the commission February 27, it was found in part:

"That the defendant company and the city have stipulated and agreed to reduce the minimum charge of 50 cents imposed by said company to 25 cents, and that such change as so reduced is fair, just and reasonable."

Subsequent to the making and entry of such findings, the Seattle Lighting Company sought a rehearing on the question, which was granted by the commission.

In its order the commission says the testimony brought out proved conclusively that a minmum of 25 cents is reasonable and fair. The minimum of 50 cents is ordered canceled and abandoned, and a minimum of 25 cents substituted, to become effective 20 days after to-day.

MAY NOT SELECT THOSE TO SERVE.—The Public Service Commission of Pennsylvania has handed down an order directing the Abington Electric Company to furnish service to a house and barn in Factoryville. It appeared from the testimony that the premises of the complainant are in the built-up portion of the borough, and the company refused to supply the service on the ground that the expense would be out of proportion to the return on the investment. The commission decided that service could be rendered without any great expense, and indicated how it could be done. Commenting on the case, the commission says: "We do not think that any public service company has the right to adopt a policy whereby it will serve only such customers as are remunerative at the time of installation. When a public service company secures a charter from the State and a franchise from a municipality in which it seeks to operate, it owes a duty to the public therein which it cannot perform by only serving such of the inhabitants thereof as it may, for reasons of its own, determine. We think it should make a reasonable effort and be compelled to serve all of the public in such municipality that can be reached by a reasonable outlay of its capital, and the service to be rendered to the public therein should be considered as a whole, and not from the individual standpoint of the profitable patrons only. That a public service company should have the right to pick out the profitable customers and leave all others without service would not, in our opinion, be rendering such public service as the law contemplates."

LEGISLATURE SUPREME.—A case involving the question of rates, given by utilities to municipalities, was recently decided in New Jersey, when the Public Utility Commission was upheld by the State Supreme Court in its order fixing a water rate of 30 cents per 1,000 gallons in North Wildwood.

The municipality contested the order on the ground that it had a contract with the water company fixing a maximum rate of 25 cents. The court held that, as the creator of the water company the Legislature has the power to waive the contract as to the city, but admitted that a different question would have been involved had the company pleaded the contract as a bar to making a lower rate than stipulated.

Financial Notes.

AT a special meeting of the board of directors of the CITIES SERVICE COMPANY, held Nov. 10, the officers were authorized to sell $5,000,000 preferred and $2,500,000 common stock for cash. A strong syndicate of American interests has purchased this stock, and the sale will enable the company to retire its entire floating debt and give ample working capital. Arrangements with purchasers provide that their stock will not be offered to the public at present, and purchasers may withdraw their stock from the syndicate only upon agreement that the preferred stock will be sold for not less than 85 and common at not less than 125. Holders of preferred stock of the company of record Dec. 15, 1915, will be given the right on Jan. 1, 1916, to receive 5% convertible debentures of the company to the amount of 9% of their holdings as payment for the deferred dividends to that date, the holder to have the right to convert these debentures at any time into stock upon a basis of $100 of preferred stock and $25 of common stock for each $100 in debentures. Holders of common stock will have 9% in debentures set aside for them, and certificates will be issued to holders of record December 15, 1915, which will entitle them to receive debentures when all holders of preferred stock have been paid their deferred dividends. Company will resume regular monthly dividends in cash on its preferred stock February 1st to holders of record January 15, 1916. September earnings of subsidiaries show appreciable increases. The Denver Gas and Electric Light Company registered a gain in net for the 12 months ending September 30 of nearly 15%, or over $200,000. In the Joplin district the Empire District Electric Company shows great progress in earnings. A gain in gross of 16½% and in net of 25% was made for the 12 months period. The month of September ran over $40,000 gross and about $19,000 net ahead of September, 1914. The gross earnings are the greatest in the history of the company. The Massillon Electric and Gas Company reports net earnings having more than doubled during the year, with a gain of 33½% in gross. Subsidiaries in the south, particularly those at Bristol, Va., Galveston and Amarillo, Tex., and Durham, N. C., show substantial gains in both gross and net earnings. The natural gas properties in Central Ohio, Oklahoma and Kansas also report large increases.

CONSOLIDATED GAS AND ELECTRIC LIGHT AND POWER, of Baltimore has declared the quarterly 1¾%, payable January 3 to holders of record December 15. In a statement of earnings for the 3 months ending September 30, the net earnings of the company are reported as $750,640, compared with $688,074. The net income for this period was $337,387, contrasted with $290,653 for the period in 1914. The common shares of the Consolidated have been admitted to the list of securities sold on the New York Stock Exchange. The common stock alone was listed, it being the intention of the management to eventually retire the preferred stock, and for this reason it was not listed.

ST. LOUIS capitalists have been working for several months on a proposed merger between the UNION ELECTRIC LIGHT AND POWER COMPANY, the UNITED RAILWAYS COMPANY and the LACLEDE GAS LIGHT COMPANY, but the plans have come to nothing, and one of the men interested pointed out that the merger probably will not be accomplished because of the Missouri anti-trust law. The North American Company, which owns a controlling interest in the Union Electric and a large interest in the United Railways, is said to be anxious to get rid of its St. Louis holdings. It is understood that the Laclede Gas Light Company, which is the most prosperous of the three companies, is not anxious to form a merger. This company was formed by a special act of the legislature, in 1857. Its charter is perpetual. The company has issued $10,700,000 common stock and $2,500,000 preferred. It has a funded debt of $22,500,000, and surplus earnings from 1910 to 1914 of about $850,000. The net surplus in 1914 was $128,448. The officers are: Charles L. Holman, St. Louis, president; G. H. Walker, first vice-president; W. H. Whitton, secretary and treasurer. Directors are: D. R. Calhoun, Murray Carleton, Alonzo C. Church, E. A. Fraust, Charles L. Holman, W. C. McBride, Edward Mallinckrodt, James E. Smith, R. H. Stockton, F. G. H. Walker, F. O. Watts, Rolla Wells and Thomas H. West.

IN a letter to the stockholders of STANDARD GAS AND ELECTRIC COMPANY, President H. M. Byllesby says: "Referring to the circular which was sent to you, dated September 1st, 1915, you are advised that the subscriptions therein set forth have been in excess of $2,000,000 par value of the notes referred to, and the plan is declared effective. The proceeds of the notes sold will accomplish the retirement of the Collateral Trust Notes due June 1, 1916, and your directors, at their next meeting, will declare, for payment December 15, 1915, to shareholders of record November 30, a quarterly cash dividend of 1% upon the preferred stock of the company. The sale of additional twenty-year 6% gold notes will be proceeded with, and it is expected that additional substantial amounts will be sold. If this does not prove to be the case some plan will be adopted for the accomplishment of the other purposes set forth in the circular relative to these notes."

HOLYOKE, Mass., has offered for sale $100,000 4% 20-year gas and electric light bonds.

THE $700,000 CONSOLIDATED GAS COMPANY of New Jersey 5% bonds, recently authorized by the New Jersey Public Service Commission, and sold by the American Light and Traction Company to Bodell & Co., of Providence, are a legal investment for Rhode Island's savings banks. The bonds are a part of an authorized issue of $5,000,000, of which $1,000,000 are reserved to retire the first mortgaged bonds of 1936. They are the first to be offered under the first and refunding mortgage.

CONTENTS.

AN ASTERISK (*) DENOTES AN ILLUSTRATED ARTICLE.

*SIZES AND EQUIVALENT LENGTH OF SERVICES, by J. M. Spitzglass 337

*EXAMINATION OF A CONDENSATE FROM CARBURRETTED WATER GAS, by E. T. Sterne 339

*ROUTINE OF BILLING AND RECEIVING DEPARTMENT, by W. P. Baird 340

EDITORIALS 344
Professor Lewes Passes-On—A. G. I. Board of Directors Meeting—New Jersey State Gas Association Meeting.

SPECIAL ENGLISH CORRESPONDENCE 345

WHO AM I? 346

INDUSTRIAL FUEL DATA 348

SAFETY AND LIGHTING 348

Recent Patent Issues 348

MEETING OF THE GERMAN GAS AND WATER ASSOCIATION. 349

*DAY AND NIGHT AT THE EXPOSITION 349

NEW METHODS AND APPLIANCES 349
Coke Quality.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES 350
More for Pre-Pay Gas—Oklahoma Essay Contest—Lebanon Announces New Rates—Foundation All Right—For Fuel Economy—Brooklyn Business—Failure to Begin Condoned—Electric Heating Competition—Gas Machinery Company Set—Victoria, Tex., Franchise—A Long Postponed Reduction—New Holder at Battle Creek—Gas Naturally Short—Another Case—Mr. Stone Wins Prize—Three I's Business Good—Who Owns It?—Stay to Rates—Ypsilanti Plant Pays—Women After Charlotte Gas—Gas Heating Project—Post Card Bills—Consumers to Pay Part—And other items.

UTILITIES COMMISSION NEWS 351
Investigating the New York Commissions—Fixes Minimum at Twenty-five Cents—May Not Select Those to Serve—Legislature Supreme.

Financial Notes 352

Public Lighting Table for Dec., 1915 (Ad. Section) 7

Meeting Times of the Various Gas Associations (Advertising Section) 21